



INSECT PEST MANAGEMENT

There are more than twenty common insect pests of field corn. The potential for at least one of them to cause problems makes it worthwhile to scout cornfields for insect damage to determine if control tactics are needed.

Scout cornfields weekly from seedling emergence until the corn is knee-high. Thereafter, scout fields periodically until tasselling, at tasselling, and during ear formation.

How to Scout Corn for Insect Pests

To scout corn, walk across the field in a zigzag or a “U” pattern. Look for any areas where there has been poor emergence, where the seedlings appear to be unhealthy (yellowed, stunted, or deformed plants), where there is evidence of insect chewing, or where plants appear to have been cut off at ground level. Look for patterns in the field. For example, perhaps poor emergence occurs in a regular pattern, such as in low spots where growing conditions are poor, at the end of each row, or in every eighth row. Maybe the damage occurs only on the edges of the field.

Insect damage tends to occur in patches. Use a shovel or trowel to dig in the affected area and at the margins of the patch. Look for the insects themselves or for damaged plants. When the corn is small, insects cause injury by eating out seeds, pruning roots, and feeding on the growing point, causing plant death or deformation. As the plants grow, look for insects and insect damage in the leaf whorl, at the base of the leaf sheath, on the tassels, silks, and the developing ear, and in the stalk. “Identifying Caterpillars in Field, Forage, and Horticultural Crops,” ANR-1121, may be useful in identifying insect pests.

Insects to Look for

Corn insect pests can be divided into five categories related to the corn plant's growth stage:

- Insects that feed on seedlings, reducing plant stand and health in the first few weeks;
- Insects that feed in the whorl;
- Insects that feed on tassels and silks, interfering with pollination;
- Insects that feed on ears and individual kernels; and
- Insects that tunnel in the stalk, causing lodging and ear loss.

Insects That Feed on Seedlings

Seedlings are the most easily damaged corn plant stage. Protecting them from insect feeding is important because the

farmer must achieve an adequate plant population during this stage to realize full yield potential. When damage has been caused by billbugs, wireworms, sugarcane beetles, or white grubs, there is little that can be done in the current year. For fields with a history of damage by these insects, plant seed treated with higher rates of insecticide seed treatment or apply a broad spectrum at-planting insecticide. See *When to Use At-Planting Treatments* further in this discussion.

Billbugs are robust, reddish-brown or black beetles with long, curved snouts. They are about 0.5 inch long and often covered with mud. They attack corn at the base of the stalk or just below the soil's surface. Billbugs feeding on unfurled leaves result in rows of circular to elliptical holes across the leaf when it expands. Billbugs are more numerous in no-till systems. They usually cause economic damage in corn following corn (not rotated), corn in fields adjacent to the past year's corn, or in fields seriously infested with nutsedges and crabgrass. Rotation is an effective management tool for billbugs because the insect has only one generation per year, moves by crawling, and has a limited host range. Rotation is particularly effective when large blocks are rotated, maximizing isolation. In no-till systems, subsoiling can help enhance the vigor of corn and increase tolerance for billbug infestations. Good fertilization and irrigation can increase the plant's tolerance to billbugs.

Wireworms are yellow-brown, wire-like insects. Their bodies are hard and feel slick. Wireworms vary in size from 0.5 to 2 inches long. They live in the larval stage for several years, depending on the species, and grow up to become click beetles. Wireworms prune roots and burrow in the base of seedlings, causing stunting or death of plants. They also will feed on germinating seed. Wireworms are more common in certain conservation tillage situations.

Wireworms are likely to occur where corn has been double cropped after grain, pasture, or clover, or when it has been planted after weedy fallow. Wireworms can inhabit the soil to a depth of up to 5 feet, and they are very difficult to find. They may be even worse in corn planted early in cold soil. Since the oldest larvae cause the greatest amount of damage, it is possible to scout for these wireworms in the soil before planting. Use bait consisting of 0.5 cup of mixed wheat and corn seed soaked overnight in water. Place the bait in a little hole in the soil; then cover it with soil. Place 10 traps per acre in fields, especially those that have been in grass fallow.

After seeds have germinated, dig out the soil in a 12- x 12-inch soil core surrounding the bait. Examine the soil for wireworms. If one or two traps are infested, use an at-planting insecticide or seed treatment.

White grubs are occasional pests of corn. Plant damage is caused by the grubs' feeding on the roots of the plant. White grubs are the immature feeding stage of May beetles, Japanese beetles, masked chafers, and other scarab beetles. They live one to three years as grubs, depending on the species.

Green June beetle grubs may appear in fields where organic fertilizer, such as broiler litter, is used. See ANR-991, "Biology and Control of Green June Beetle," <http://www.aces.edu/pubs/docs/A/ANR-0991/>. In September, scout fields where broiler litter has been used and control grubworms in the fall to prevent damage to corn seedlings.

Sugarcane beetle adults are black and about 0.5 inch long; they gouge holes in stalks just below the ground's surface. Infestations are worse in reduced tillage systems following grass, fallow, or small grains. **Corn planted into a field that has been in pasture for several years is at risk regardless of tillage practices.**

Sugarcane beetle adults are active at the time corn is planted. Certain seed treatments and at-planting insecticides may be useful in controlling this beetle. Foliar sprays are unlikely to provide control of the pest because it tends to feed and live just below the soil surface. Do not replant corn into an infested area while adult beetles are still present.

Cutworms can actually cut small corn plants off at the base. Cutworm damage is largely confined to plants less than the eight-leaf stage. Damage is most likely to occur when seedlings are growing slowly because of adverse environmental conditions. Cutworms can usually be monitored by the damage they do. "Window-pane" feeding is a sign of young cutworms. Larger worms cut plants off near the soil line. If cut plants are found, check the top 2 inches of soil extending 4 inches from both sides of the row where the plants have been cut. Cutworms normally spend the day just under the soil surface or under debris close to their feeding sites. There are several different kinds of cutworms. The mature larva is a plump, smooth, greasy-looking, dark gray, spotted or striped caterpillar.

Consider control measures for cutworms if more than 10 percent of seedlings are cut and the worms are present. Cutworms tend to be associated with no-till corn and/or with fields where there was a substantial cover of green weeds in the previous year or just prior to planting. Burn down cover crops and/or weeds four weeks before planting to reduce problems with cutworms. Otherwise, apply an inexpensive pyrethroid at planting to control cutworms in these situations.

Chinch bugs overwinter on the edges of fields in wild grasses like big bluestem and broom sedge. Weather conditions in the winter can cause many chinch bugs to die on the overwintering hosts. In spring, they move into transition hosts like wheat. Later, they may invade corn. Invasion can occur at any time, but corn is most susceptible when it is less than a foot tall.

Chinch bugs congregate at the base of plants and thrive in cracks and crevices that develop as the soil dries. They suck sap from roots, leaves, and stems of plants, causing stunting, deformation, wilting, and plant death. The plants may be

purpled at the base. Chinch bug wounds may be invaded by soft rots, causing further damage. Plants with severely damaged roots may lodge.

The adult chinch bug is black with white wing covers. It is about 0.2 inch long. Immature chinch bugs are reddish brown with a white band running horizontally around their bodies. They can be hard to find because they hide in the leaf sheaths, under residue, or in cracks in the soil.

A plant damaged by chinch bugs is often brittle and will break off if it is moved from side to side. Vigorously growing corn can often outgrow potentially damaging insect situations. However, stresses such as cold temperatures, too much or too little water, and herbicide injury will cause the corn to grow less vigorously.

Chinch bugs almost always occur in patches, starting near the edges of a field. They usually congregate on isolated plants and then move outward. Chinch bugs tend to be worse in fields with the most surface residue. Therefore, corn in fields with reduced tillage or with grassy weeds is prone to chinch bug damage. Some of the worse damage occurs in heavy clay soil because the soil tends to crack, allowing the bugs to get down to feed on the roots.

If infestations are detected early enough, a corrective insecticide treatment may be applied. At-planting insecticides or seed treatments can protect young plants from chinch bugs, up to about 25 days after emergence (V1-V3). Otherwise, use a directed spray of a foliar insecticide. Treat for chinch bugs when three to five bugs per plant are found in 20 percent of the corn in a field and when the plants are under water stress or are growing slowly due to herbicide stress or cool temperatures. It is important to aim the insecticide at the base of the plant where the bugs congregate. If the chinch bugs are still migrating into a field, a second application of insecticide may be necessary.

Flea beetles are shiny black bugs that jump instantly when they are disturbed. Look for their characteristic feeding "scratch marks." Flea beetles seldom cause economic damage to cornfields in Alabama. Plants are more susceptible when temperatures are cold, causing seedling growth to slow down. However, the growing point stays below ground level until about the time that the fifth leaf emerges, so plants are usually able to recover from flea beetle injury. Consider treatment only when 75 percent of plants are infested or when more than five beetles per plant are found. Beetles are more numerous during cold springs following mild winters.

Thrips are tiny, fast-crawling, yellow or black insects found in the young plant. They cause "sandblasting" on the leaves. The leaf mottling caused by thrips looks silvery in severely damaged plants. Thrips seldom cause economic damage to corn. Consider treatment only if more than 80 percent of the leaf area is affected or if the plants are severely deformed.

Leafhoppers are small, wedge-shaped, green or brownish bugs that suck sap from buds and leaves of corn. Damage by this insect is seldom great enough to justify control. However, two leafhopper species are responsible for spreading corn stunt virus disease. This disease can cause severe stunting and a subsequent reduction in yield. Try to plant virus-resistant corn to minimize the impact of this virus. If corn that is susceptible to corn stunt virus is to be planted, an at-planting systemic insecticide or seed treatment will help control the leafhopper vectors and, hence, the disease.

Southern corn rootworms can make a circular tunnel through the young seedling, causing severe damage if the growing point is eaten. Damage from this pest is most likely when a legume cover crop has been planted. If such a cover crop is planted, be sure to kill it with herbicides four weeks before planting. Southern corn rootworms overwinter as adults. Eggs are laid in the spring and the larvae attack seedling corn.

Stink bugs are major pests of young corn, particularly in South Alabama. At least three species—southern green stink bug, brown stink bug, and green stink bug—occur in Alabama. Brown marmorated stink bug, an invasive species, has recently been found in Alabama. Its impact on field corn is yet to be determined. The brown stink bug is generally hardest to control with insecticides. Stink bugs overwinter as adults under plant residue, tree bark, or culverts in drainage areas. At least two generations occur each year. Parasites and predators, including fire ants, contribute to stink bug control. Certain conditions predispose a cornfield to stink bug problems, including excessive weeds in winter or spring prior to planting, double cropping, and conservation tillage. Corn planted near wheat fields may also be more likely to have problems with stink bugs. Stink bugs have a wide host range, including wheat, corn, cotton, and soybeans. Stink bugs will move from one field to another during the season. Plants on field borders may be more severely affected than those further into the field. Stink bug infestations are very clumped and are hard to scout.

Stink bugs have sucking mouthparts, which they insert into the plant in order to feed. On young corn plants, stink bugs feed at the base of the plant and injure the growing point. Extreme feeding leads to the death of plants.

If the growing point is badly damaged, the plant may develop multiple stems. Moderate feeding results in a buggy whip symptom, where one side of the plant grows faster than the other and the tips of the leaves are entangled in the whorl. If more than 10 percent of plants show a buggy whip symptom, or if there are more than one or two stink bugs per plant, an insecticide treatment may be justified. As the corn gets older, stink bugs can damage the developing ears. See the stink bug section later in this publication for information on control.

Insects That Feed in the Whorl

Fall armyworms, corn earworms, European corn borers, cereal leaf beetle adults, and grasshoppers can feed on corn leaves, particularly in the whorl stage. Use Table 1 to determine if the potential amount of damage from these leaf-feeding insects justifies using a corrective treatment.

Fall armyworms, corn earworms, southwestern corn borers, and European corn borers cause damage in more than one category. They are general feeders that feed in the whorl and attack the corn ear as well. Also, corn borers can cause plant lodging by boring into the cornstalks. Each of these insects has alternate hosts and each one has several generations per year. It may be economically feasible to use an insecticide to control these pests if they are causing excessive damage in the whorl stage. But, it is not usually economically feasible to control them in the ear stage with insecticides. See Bt corn section and Table 3 for a discussion of this method for controlling whorl-feeding caterpillars. European corn borers are found in north Alabama. See *Insects That Attack the Stalk* for further discussion of corn borers.

Table 1. Yield Loss Potential in Bushels per Acre

| Stage of Growth | Percent Leaf Area Destroyed | | | | |
|-----------------|-----------------------------|----|----|----|-----|
| | 20 | 40 | 60 | 80 | 100 |
| 7 leaf | 0 | 1 | 4 | 6 | 9 |
| 9 leaf | 0 | 2 | 6 | 9 | 13 |
| 11 leaf | 1 | 5 | 9 | 14 | 22 |
| 13 leaf | 1 | 6 | 13 | 22 | 34 |
| 15 leaf | 2 | 9 | 20 | 34 | 51 |
| 17 leaf | 4 | 12 | 27 | 45 | 69 |
| Tassel | 7 | 21 | 42 | 68 | 100 |
| Silks Brown | 6 | 18 | 38 | 60 | 90 |
| Blister | 5 | 16 | 30 | 50 | 73 |
| Milk | 3 | 12 | 24 | 41 | 59 |
| Soft Dough | 2 | 8 | 17 | 29 | 41 |
| Dent | 0 | 4 | 10 | 17 | 23 |

Source: van Duyn, North Carolina State University.

Grasshopper outbreaks are likely to occur during a drought and for the next 1 to 2 years. There are numerous grasshopper species that attack corn. They overwinter as eggs in the soil. Best control is achieved when grasshoppers are still young. It is very difficult to kill nearly mature grasshoppers of most species and almost impossible to kill lubber grasshoppers (black with yellow markings). Infestation of grasshoppers is highest in no-tillage situations, along field margins.

Cereal leaf beetles are pests of wheat, oats, and other small grains. Adults emerge as the grain crop is drying and migrate to other areas, including cornfields, in search of food. Cereal leaf beetles make long, narrow feeding scars between leaf veins. Leaf feeding by these beetles is usually cosmetic. They do not stay very long in cornfields. Therefore, damage is a single, short-term event that rapidly developing corn plants usually outgrow.

Insects That Feed on Tassels and Silks

Japanese beetles, corn earworm larvae, corn rootworm adults, and grasshoppers may all clip corn silks. When these insects feed on the silks and clip them off, the result can be incomplete pollination. Silk clipping has to be severe to affect pollination. Therefore, it is very important to determine when silk clipping is occurring relative to the pollination process. Pollination occurs 3 to 8 days after full tasselling, and it takes 12 to 24 hours for a pollen grain to move down the silk. Poor pollination results in ears that are only partially filled, ears that are smaller than normal, and barren stalks. An insecticide treatment to protect the silks may be justified if (1) less than 75 percent of the ears have silks; AND (2) there are five or more rootworm beetles or two or more Japanese beetles on each ear, or there are corn earworm larvae on each ear; AND (3) silks are being clipped to within 0.5 inch of the ear tip.

Corn leaf aphids are small, blue-green, soft-bodied insects with dark blue “tail pipes.” They usually colonize the upper leaves and tassels of corn plants. Numerous white cast skins are usually seen on the plant and on the ground around the plant. Aphids excrete a sticky substance that may coat nearby plant parts. Microorganisms use this “honeydew” as a food source, resulting in a blackened condition called “sooty mold.” High

populations on the tassels and silks can interfere with pollination. Treatment may be justified when there are 50 or more aphids on 50 percent or more of the plants when plants are tasselling.

Insects That Feed on Ears

Stink bugs feed on all plant parts but prefer the high liquid content in developing grain. Ears moderately damaged by stink bugs will typically crook away from the plant stem. Kernels are aborted at and near the feeding site.

Stink bug feeding on young ears, prior to pollination, often results in the destruction of those ears. Best results are obtained if corn is treated while the ear is forming (less than 1 inch long), around the V15 growth stage. At that time, two stink bugs per plant can reduce yields by 40 percent. Therefore, at this stage, treat if 5 percent of plants have stink bugs. At kernel fill, treat if 10 percent of the plants have stink bugs. At the V18 stage, ears approximately 2 inches long, through the R1 stage, stink bug feeding can also result in reduced yields. Therefore, continue to protect corn plants from stink bugs through the silking stage. After silking, losses due to stink bugs are usually not as significant.

Corn earworm caterpillars (second generation) feed on corn ears. Feeding is usually confined to the tip end of the ear. When corn earworms feed on kernels, they open the husks and provide an entry for disease and bird feeding. The female lays her eggs one at a time, usually on the developing silks. Small larvae feed on the silks and then enter the tip of the ear where they will feed on developing kernels. Corn earworm larvae will reach 1.5 inches in length in about 14 to 21 days. Because the larvae are cannibalistic, there will usually be only one earworm larva per ear.

Ear feeding is common in most cornfields, with 60 to 100 percent of the ears having a single caterpillar in years of high populations. Also, secondary ears may be infested. Yield loss in typical field corn, though, is usually not more than 3 percent. Since chemical control requires multiple applications, spraying to reduce ear infestation is seldom economically justified in field corn.

Fall armyworm larvae also feed on developing kernels. The caterpillar generally enters the ear from the sides as well as from the tip of the ear. When populations are heavy, it is not unusual to find several worms within a single ear. It is difficult to control the ear-attacking phase of the fall armyworm. Early-planted corn is less likely to be damaged.

European corn borer larvae (also see below) bore into kernels and cobs. If the corn borer damages the ear shank, the entire ear can fall to the ground. Early-planted, early-maturing corn is recommended in order to escape the heavier pest populations that occur as the weather becomes warmer. Chemical control is effective only when the timing of the application kills the larvae before they enter the ear. See Bt corn section for more information.

Insects That Attack the Stalk

Stalk borers are best managed using Bt corn that is active on stalk borers. Refuge requirements prevent the use of this corn on all the acreage. To control stalk borers in the refuge corn, see the list of insecticides that can control stalk borers before they enter the corn plant in Table 6.

European corn borers (second generation) usually infest corn during the silking stage. Silks make the field more attractive to the female corn borer moths. Average grain loss from the second generation corn borer is about 6 percent per tunnel per plant, but actual losses may be higher or lower. European corn borers also may interact with stalk rot organisms to enhance the effect of these plant pathogens. European corn borers are an occasional problem in north Alabama.

Common stalk borers are easily recognized by the transverse purple band occurring near the legs. They migrate out of field edges and waterways. Look for severe plant damage and feeding deep in the whorl. Later, they move inside the stalk.

Southwestern corn borers have several generations per year; the most serious is that which enters the stalk a few inches above the ground and girdles the inside of each stalk until it topples over. Recently this has been a severe pest in north Alabama.

Overall losses from serious infestation of southwestern corn borers can be considerable (i.e., 25 to 50 percent) if yield potential of the crop is high. They are difficult to manage because there are few cultural control options. Also, the second generation is hard to scout for, and insecticide treatments are effective only against small caterpillars before they bore into the stalk. Bt corn for corn borer is the most effective way to manage this pest. See Table 3. In fields where Bt corn for corn borer is not planted, pheromone traps can be used to help time the application of long residual insecticides to prevent stalk borers from tunneling in the stalk.

Southern corn stalk borer is a similar insect, but it does not girdle the stem.

Insects That Attack the Roots

Corn rootworms (several species). Southern corn rootworm is most likely to be a problem in fields that were weedy before spring planting. Adults are attracted to lay eggs in the weedy areas. Southern corn rootworm overwinters as adults, and the larvae attack corn early in the season, causing the young plants to die.

Recently, western corn rootworms moved into Alabama. They are now found in the northern part of Alabama. Western corn rootworm larvae can destroy most of a plant's root system, causing the plant to fall over. The plant may straighten as it recovers, giving it a goosenecked appearance. Western corn rootworm larvae hatch in May and continue to occur through late June. Injury will not appear until mid to late season, if western corn rootworm is the problem.

In summer western corn rootworms lay their eggs in the soil of cornfields. The eggs overwinter and hatch the following May. Because the eggs overwinter in the soil and the larvae feed on corn but not other major crops, this pest can be controlled by rotation with soybeans or some other crop.

Rootworms can be controlled with insecticides. The insecticides must be applied in or incorporated into the soil at

planting or shortly thereafter as a cultivation treatment. Seed treatments may also be effective. See Table 2.

Bt corn is available for control of western corn rootworms but not for southern corn rootworms. Several brands of rootworm active Bt corn are available. See Table 3.

The adults of both species—southern corn rootworm and western corn rootworm—can feed on the silks and reduce pollination.

Effects of Weather on Corn Pest Incidence

Cool temperatures delay seed germination and early-season growth. This increases the risk of insect damage because the young corn plants are exposed to a longer feeding period by insects. Fall armyworms, chinch bugs, and lesser cornstalk borers are usually more abundant in dry years.

When to Use At-Planting Treatments

The advent of seed treatments such as Poncho and Cruiser have changed the way we manage early season insects. However, there is still a place for at-planting soil insecticides in fields that are at high risk from cutworms or soil insects such as sugarcane beetle.

A field's history should help determine whether to use an at-planting insecticide or a high rate of insecticide seed treatment. Rotated, conventionally tilled corn has the least problems with early-season insects. Cornfields following pasture, in non-rotated corn, and in conservation tillage or no-till corn are at the greatest risk from early season soil insects.

Bt Corn for Corn Borers and Other Caterpillar Pests

Corn has been genetically engineered to produce Bt toxins that are effective against caterpillar insects such as European corn borer, Southwestern corn borer, and lesser cornstalk borer. Bt corn can also help protect corn against attack by corn earworm and fall armyworm. It is marketed under various names. See Table 3.

Some of the newer types of Bt corn are more effective against other caterpillars, such as fall armyworm and corn earworm. See Table 3 for more information and refuge requirements.

Results from tests in Alabama show that Bt corn for corn borers is most likely to pay off in North Alabama, in areas where there are chronic problems with stalk borers such as the Southwestern corn borer. For more information on the different types of Bt corn and how they have performed in Alabama, see the following publications: Performance of Bt Corn in North Alabama in 2010 (revised) at www.aces.edu/timelyinfo/entomology/2011/January/corrected.pdf and Performance of Bt Corn in Central and South Alabama in 2010 (revised) at www.aces.edu/timelyinfo/entomology/2011/January/corrected2.pdf

Bt corn cannot be planted on 100 percent of the corn acreage. A certain amount (20 to 50 percent) must be planted in non-Bt corn as a refuge. See Table 3 for more details.

Bt Corn for Rootworms

Corn has been genetically engineered to produce Bt toxins that are effective against the root-feeding larvae of certain beetles called corn rootworms, particularly the western corn

rootworm. It is marketed under various trade names. See Table 3.

The genes in this genetically engineered corn are different from those conferring resistance to corn borers and other caterpillar pests. Sometimes the two types of genes are stacked in a hybrid—like in Herculex Xtra or Genuity VT Triple Pro, for example—in order to give the plant resistance to rootworms and caterpillars such as corn borer.

Western corn rootworm is a pest of continuous corn in the northern half of Alabama. This is where planting a hybrid with a rootworm Bt gene will be most likely to pay off. Bt corn for rootworms is not effective against southern corn rootworm.

When to Plant or Replant Corn

When planting corn, follow the recommended planting dates for your area of the state. Planting date recommendations are available at the Alabama Cooperative Extension System office in your county.

Damage from early-season soil insect pests, cutworms, and armyworms may look drastic. However, if the cutting damage by these insects occurs above the growing point and there is no additional feeding by these insects, the plants should recover.

Recommended plant stands for Alabama are from 16,000 to 24,000 plants per acre.

Before replanting corn, consider the time the damage occurs. Oftentimes, insect damage occurs too late to replant. If 50 percent of a stand is lost during the first four weeks after the first recommended planting date in your area, immediate replanting should result in yields of 85 to 90 percent of the original estimates. However, if 50 percent or more of the stand is lost after the fourth week, replanting is not profitable. At this point, more is lost due to the late replanting date than because of the poor stand. However, a 50-percent stand reduction will usually result in severe yield reduction and is not likely to return production costs. Also, weed problems in the thinned stand will likely be severe.

Considerations for Late-Planted Corn

Certain pest insects and pathogens reach high levels in late July and August and may severely infest late-maturing corn. Late-planted corn is vulnerable to attack by the lesser cornstalk borers, fall armyworms, and the European corn borers. Also, late-planted corn is attractive to adult rootworm beetles and may have excessive silk clipping.

Organic Insecticides That Can be Applied to Field Corn

Organic producers may want to consider the following insecticides, most if not all of which are OMRI approved. Be sure to read the insecticide label to make sure it meets your needs. The following products contain azadirachtin: Neemix 4.5, Molt-X, Ecozin Plus, Azatrol, and Azatin XL. The following products contain *Bacillus thuringiensis*: Biobit HP (subsp. *kurstaki* strain ABTS-351), Dipel ES (subsp. *kurstaki* strain ABTS-351), Dipel DF (subsp. *kurstaki* strain ABTS-351), Javelin WG (subsp. *kurstaki* strain SA-11), Lepinox WDG (subsp. *kurstaki* strain EG7826), CryMax WDG (subsp. *kurstaki* strain EG7841), Agree WG (subsp. *aizawai* strain GC-91), and Xentari (subsp. *aizawai* strain ABTS-1857). PyGanic Crop Protection EC 1.4_{II} and PyGanic Crop Protection EC 5.0_{II} insecticides are OMRI approved and contain natural pyrethrins.

There are other insecticides that contain pyrethrins. Be sure to choose one that does not contain piperonyl butoxide, as that chemical is not considered organic. Pest Out contains cottonseed, clove, and garlic oils. Ecotec contains rosemary and peppermint oils. PureSpray Green contains pet-

roleum oil. Organic JMS Stylet Oil contains paraffinic oil. Entrust and Justice Fire Ant Bait contain spinosad. Other formulations of spinosad can be found. Be sure to check the labels to see if they meet the requirements for your cropping system. Other organic insecticides may be available.

Table 2. Corn Seed Treatments and Their Relative Efficacy for Control of Seedling Insect Pests in Field Corn

| Insecticide Common names, | Rate | Relative Efficacy of the Seed Treatment ¹ | | | | | | | | | | | |
|--|-------------------------------------|--|----------------|----------------|--------------------|----------------------|---------------------|--------------------------------|--------------------|---------------|---|-----------------------------|------------------------------|
| | | Corn Billbug | White Grubs | Wire- worms | Seedcorn Maggot | Cutworm ² | Sugarcane Beetle | Southern Green Stink bug | Brown Stink bug | Chinch Bug | Southern Corn Rootworm ² | Western Corn Rootworm | Lesser Cornstalk Borer |
| clothianidin | | | | | | | | | | | | | |
| PONCHO 250 or ACCELERON ³ | 0.25 mg a.i./kernel | NL | F | G | G | P-F | F | F | NL | G | E | NL | G, NL |
| PONCO 500 or ACCELERON with PONCHO VOTIVO ⁴ | 0.50 mg a.i./kernel | F | G | G | E | P-F | G | G | NL | G-E | E | P, NL | G, NL |
| PONCHO 1250 or ACCELERON ³ | 1.25 mg a.i./kernel | G | E | E | E | F-G | G | G | G, NL | E | E | G | E, NL |
| thiamethoxam | | | | | | | | | | | | | |
| CRUISER EXTREME 250 ³ | 0.25 mg a.i./kernel | NL | F | G | E | P | P | P | NL | F | G-E, NL | NL | G, NL |
| CRUISER EXTREME 500 ³ or AVICTA COM- PLETE CORN ⁴ | 0.5 mg a.i./kernel | NL | G | G | E | P | F | F | NL | F | E | NL | G, NL |
| CRUISER EXREME 1250 ³ | 1.25 mg a.i./kernel | G | E | E | E | F | F | G | NL | G | E | P | E, NL |
| imidacloprid | | | | | | | | | | | | | |
| GAUCHO 600, IMIDA E-AG 5 FST, SENATOR 600, IMIDACLOPRID 5, ATTENDANT 600 | 0.60 mg a.i./kernel ⁵ | NL | G | G | E | P, NL | P, NL | P, NL | NL | F | G, NL | NL | NL |
| LATITUDE ³ | 3.5 oz./ hundredweight | NL | F, NL | G | G | NL | NL | NL | NL | F, NL | G, NL | NL | NL |
| CONCUR ³ | 1.5 oz./ 42 lb. seed | NL | F | G | G | NL | NL | NL | NL | F, NL | G, NL | NL | NL |
| permethrin | | | | | | | | | | | | | |
| KERNEL GUARD SUPREME ³ or KICKSTART VP ³ | 1.5 oz./ 42 lb. seed | NL | F, NL | P? | F | NL | NL | NL | NL | NL | NL | NL | NL |

¹E = highly effective, G = effective, F = inconsistent results, P = not effective, based on trials in the Southeastern U.S.; L = insect is on the label for this product; NL = insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is specific knowledge to the contrary about product efficacy in the Southeast.

²In the Southeast, several species of cutworms overwinter as medium to large-sized larvae. They may be capable of cutting considerable numbers of seedlings before they eat a lethal dose of the insecticide. Black cutworm, the cutworm that appears on the label of most of these products, has a different life cycle in which eggs are laid in the spring, so that black cutworm larvae will be small if they have hatched out by the time the corn is planted. Southern corn rootworm larvae are a seedling pest, not a mid-season pest like western corn rootworm larvae.

³Product name as marketed included fungicides.

⁴Product name as marketed included fungicides and a nematicide. AVICTA COMPLETE CORN contains abamectin; ACCELERON WITH VITIVO contains *Bacillus firmus* I-1582.

⁵Other rates for this active ingredient are available. See label.

Table 3. Relative Efficacy of Various Bt Corn Products¹

| Product Trade Name (Abbreviation) | Corn Earworm (ear) | Fall Armyworm (whorl) | Corn Borers ² (stalk) | Western Corn Rootworm ³ (roots) | Black Cutworm (seedling) ⁴ | Lesser Cornstalk Borer ⁵ | Refuge Requirement ⁶ | Original Target Pests (Bt Protein) | Event(s) |
|--|------------------------|-----------------------|----------------------------------|--|---------------------------------------|-------------------------------------|---------------------------------|--|---|
| Bt Corn for Controlling Above-Ground Caterpillars (Lepidoptera) and Below-Ground Rootworms (Coleoptera) | | | | | | | | | |
| Agrisure Viptera 3111 | Excellent ⁷ | Excellent | Excellent | Fair-Good | Good | Good | 20% | Corn earworm, western bean cutworm, black cutworm, and fall armyworm control (Vip3Aa20) Corn borer protection (Cry1Ab) Corn rootworm protection (mCry3A) Liberty (glufosinate) herbicide tolerance Roundup (glyphosate) herbicide tolerance | MIR162 Bt11 GA21 MIR604 |
| Agrisure 3000 GT | Fair | Good | Excellent | Fair-Good | Poor | Good | 50% | Corn borer protection (Cry1Ab) Corn rootworm protection (mCry3A) Roundup (glyphosate) herbicide tolerance Liberty (glufosinate) herbicide tolerance | Bt11 MIR604 GA21 |
| Agrisure CB/LL/RW | Fair | Good | Excellent | Fair-Good | Poor | Good | 50% | Corn borer protection (Cry1Ab) Corn rootworm protection (mCry3A) Liberty (glufosinate) herbicide tolerance | Bt11 MIR604 |
| Genuity SmartStax (GENSS) or Dow AgroSciences SmartStax (SSX) | Very Good | Excellent | Excellent | Excellent | Good | Very Good | 20% | Corn borer, fall armyworm, corn earworm, western bean cutworm, black cutworm protection (Cry1A.105, Cry2Ab2, Cry1F) Corn rootworm protection (Cry3Bb1, Cry34Ab1/35Ab1) Roundup (glyphosate) herbicide tolerance Liberty (glufosinate) herbicide tolerance | MON89034 MON88017 TC1507 DAS-59122-7 |
| Genuity VT Triple PRO (GENVT3P) | Good-Very Good | Excellent | Excellent | Excellent | Poor | Very Good | 20% | Corn borer, fall armyworm, corn earworm protection (Cry1A.105 and Cry2Ab2) Corn rootworm protection (Cry3Bb1) Roundup (glyphosate) herbicide tolerance | MON89034 MON88017 |
| Herculex XTRA (HXX) | Poor | Very Good | Excellent | Excellent | Good | Very Good | 50% | Corn borer, fall armyworm, western bean cutworm, and black cutworm resistance (Cry1F) Corn rootworm resistance (Cry34Ab1/Cry35Ab1) Liberty (glufosinate) herbicide tolerance | TC 1507 DAS 59122-7 |
| YieldGard VT Triple (VT3) | Fair | Good | Excellent | Excellent | Poor | Good | 50% | Corn borer protection (Cry1Ab) Corn rootworm protection (Cry3Bb1) Roundup (glyphosate) herbicide tolerance | MON810 MON88017 |

continued

Table 3. Relative Efficacy of Various Bt Corn Products¹

| Product Trade Name (Abbreviation) | Corn Earworm (ear) | Fall Armyworm (whorl) | Corn Borers ² (stalk) | Western Corn Rootworm ³ (roots) | Black Cutworm (seedling) ⁴ | Lesser Cornstalk Borer ⁵ | Refuge Requirement ⁶ | Original Target Pests (Bt Protein) | Event(s) |
|---|--------------------|-----------------------|----------------------------------|--|---------------------------------------|-------------------------------------|---------------------------------|--|----------------------------|
| Bt Corn for Controlling Above-Ground Caterpillars (Moths, Lepidoptera) | | | | | | | | | |
| Agrisure CB/LL | Fair ⁷ | Good | Excellent | None | Poor | Good | 50% | Corn borer protection (Cry1Ab) Liberty (glufosinate) herbicide tolerance | Bt11 |
| Agrisure Viptera 3110 | Excellent | Excellent | Excellent | None | Good | Good | 20% | Corn earworm, western bean cutworm, black cutworm, and fall armyworm control (Vip3Aa20) Corn borer protection (Cry1Ab) Liberty (glufosinate) herbicide tolerance Roundup (glyphosate) herbicide tolerance | MIR162 Bt11 GA21 |
| Genuity VT Double PRO (GENVT2P) | Good-Very Good | Excellent | Excellent | None | Poor | Very Good | 20% | Corn borer, fall armyworm, corn earworm protection (Cry1A.105 and Cry2Ab2) Roundup (glyphosate) herbicide tolerance | MON89034 NK603 |
| Herculex I (HX1) | Poor | Very Good | Excellent | None | Good | Very Good | 50% | Corn borer, western bean cutworm, black cutworm and fall armyworm resistance (Cry1F) Liberty (glufosinate) herbicide tolerance | TC 1507 |
| YieldGard Corn Borer (YGCB) | Fair | Good | Excellent | None | Poor | Good | 50% | Corn borer protection (Cry1Ab) | MON810 |
| Bt Corn for Controlling Below-Ground Rootworms (Beetles, Coleoptera) | | | | | | | | | |
| Agrisure RW | None | None | None | Fair-Good | None | None | 20% | Corn rootworm protection (mCry3A) | MIR604 |
| Herculex RW (HXRW) | None | None | None | Excellent | None | None | 20% | Corn rootworm resistance (Cry34/35Ab1) Liberty (glufosinate) herbicide tolerance | DAS-59122-7 |
| Optimum Intrasect | Fair-Good | Very Good | Excellent | None | Good | Very Good | 20% | Corn borer, black cutworm, lesser cornstlk borer, and fall armyworm resistance (Cry1F) Corn borer protection (Cry1Ab) Liberty (glufosinate) herbicide tolerance Roundup (glyphosate) herbicide tolerance | TC 1507 MON810 NK603 |
| YieldGard VT Rootworm/RR2 (VTRR2) | None | None | None | Excellent | None | None | 20% | Corn rootworm protection (Cry3Bb1) Roundup (glyphosate) herbicide tolerance | MON88017 |

¹ Most of these insect resistant products are marketed as stacks with herbicide resistant products.

² Southwestern corn borer, European corn borer, and sugarcane borer.

³ There are several species of corn rootworm in the Southeast. Southern corn rootworm is the most prevalent species. These "rootworm" products are not effective against southern corn rootworm. They are effective against western corn rootworm larvae, which occur in areas such as north Alabama and north Georgia.

⁴ Based on limited data.

⁵ Lepidopteran Bt traits do not specifically list lesser cornstalk borer as a target pest.

⁶ See product Insect Resistance Management (IRM) documentation from the seed companies for more details.

⁷ The meaning of these terms is somewhat arbitrary. Excellent usually means better than 95% control. Poor means about 30% control. Rankings are meant to be relative. Based on input from the Southern Corn Insect Working Group who meet at the Annual Meeting of the Southeastern Branch, Entomological Society of America.

Table 4. Examples of Broad-Spectrum At-Planting Insecticides for Insect Pests of Corn Seeds and Seedlings

| Insecticide (Trade Names) | Rates | Pests Controlled Include |
|---|---------------------------|---|
| chlorpyrifos (Lorsban 15G) ^{1,2} | 8-12 oz./1000 row ft. | Seedcorn maggot, Southern corn rootworm, White grubs, Cutworm, Lesser cornstalk borer |
| chlorpyrifos (Lorsban Advanced) ^{1,2} | 2-6 fl. oz./1000 row ft. | Seedcorn maggot, Southern corn rootworm, White grubs, Cutworm |
| terbufos (Counter CR) ^{1,2} | 6 oz./1000 row ft. | Seedcorn maggot, Southern corn rootworm, Wireworms, White grubs |
| bifenthrin (Capture 2E) ^{1,2} | 0.15-0.3 oz./1000 row ft. | Seedcorn maggots, Southern corn rootworm, Wireworms, White grubs, Cutworm, Lesser cornstalk borer |
| bifenthrin + chlorethoxyfos (Smart Choice 5G, Lock N Load) ^{1,2} | 3-5 oz./1000 row ft. | Seedcorn maggots, Southern corn rootworm, Wireworms, White grubs, Cutworms |

See the insecticide label for specific use instructions, including whether product is to be applied in-furrow, as a T-band, or broadcast.

¹ Other trade names available see Table 7.

² Other insecticides are labeled for at-planting control of cutworms or other pests. These include the pyrethroids beta-cyfluthrin (Baythroid XL), cyfluthrin (Tombstone, Defcon 2.1G), esfenvalerate (Asana XL), gamma-cyhalothrin (Declare, other trade names), lambda-cyhalothrin (Karate with Zeon Technology, other trade names), permethrin (Pounce, other trade names), and zeta-cypermethrin (Mustang Max, other trade names). The insecticide mix chlorpyrifos+gamma-cyhalothrin (Cobalt) also can be applied at-planting, as can the insecticide mix bifenthrin + imidacloprid (Swagger), phorate (Thimet 20), and chlorethoxyfos (Fortress 5G). Please see their labels for specific use instructions.

This table was adapted from a table prepared by Scott Stewart, University of Tennessee.

Table 5. Suggestions for Postemergence Corn Insect Control¹

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient Per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---------------------------------|---|--------------------------------|--------------------------------|--|--|
| Armyworms, Fall and True | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.0113-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. Use highest rate for fall armyworms. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.03-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1-2 qt. | 1-2 | 14 (silage, green) 48 (fodder, grain) | |
| | chlorantraniliprole CORAGEN Other trade names ² | 3.5-5.0 fl.oz. | 0.045-0.065 | 14 | |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75WG Other trade names ² | 1-2 pt. 0.67-1.33 lb. | 0.47-0.93 0.5-1 | 21 21 (grain, ears) Grazing interval not specified | Use on true armyworms only. See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 13-26 fl.oz. | 0.25-0.51 + 0.004-0.009 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 11-26 fl.oz. | 0.21-0.51 + 0.011-0.026 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025-0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. Use high rate for fall armyworm. |
| | deltamethrin DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018-0.022 | 21 (harvest, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA 0.66 EC Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 | Use on true armyworms. Asana is a RESTRICTED USE pesticide. |
| | flubendiamide BELT SC | 2-3 fl.oz. | 0.063-0.094 | 28 (grain, stover) 1 (forage, silage) | |

¹ See Table 6 for approximate relative efficacy of postemergence insecticides for control of corn insects. See Table 7 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Armyworms, Fall and True (cont.) | | | | | |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.02-1.54 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04- 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methomyl LANNATE 2.4LV Other trade names ² | 0.75-1.5 pt. | 0.22-0.45 | 21 (grain, fodder) 3 (grazing, silage) | Lannate is a RESTRICTED USE pesticide. |
| | methoxyfenozide INTREPID 2F | 4-16 fl.oz. | 0.06-0.25 | 21 | |
| | methyl parathion PENNCAP-M 2FM Other trade names ² | 2-3 pt. | 0.5-0.75 | 12 | PennCap-M is a RESTRICTED USE pesticide. For true armyworms. |
| | permethrin POUNCE 25 WP Other trade names ² | 6.4-9.6 fl.oz. | 0.1-0.15 | 30 (grain, fodder) 0 (forage) | Pounce is a RESTRICTED USE pesticide. |
| | spinetoram RADIANT SC | 3-6 fl.oz. | 0.023- 0.046 | 28 (grain or straw) 3 (forage, fodder, hay) | Use higher rate for heavier infestations or larger larvae. |
| | spinosad TRACER Other trade names ² | 1-3 fl.oz. | 0.031- 0.094 | 28 (grain) 3 (forage, fodder) | Use higher rates for heavier infestations. Time applications to peak egg hatch. |
| | spinosad + gamma- cyhalothrin CONSERO | 2-3 fl.oz. | 0.03-0.046 + 0.01- 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 3.2-4 fl.oz. | 0.02-0.025 | 30 (grain, stover) 60 (forage) | Control may be variable. Mustang Max is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|---|--------------------------------|--------------------------------|--|---|
| Billbugs | | | | | |
| <i>General Comments: Billbug damage often shows up after the insects are through feeding. See Table 2 for suggested seed treatments and Table 4 for at-planting insecticides for control of billbugs.</i> | | | | | |
| | chlorpyrifos LORSBAN ADVANCED | 2 pt. | 0.93 | 21 | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. |
| | LORSBAN 75 WG Other trade names ² | 1.33 lb. | 1 | 21 (grain, ears) Grazing interval not specified | Lorsban 75WG is not. |
| | chlorpyrifos + gamma- cyhalothrin COBALT | 38-42 fl.oz. | 0.74-0.82 + 0.013- 0.015 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda- cyhalothrin COBALT ADVANCED | 32-42 fl.oz. | 0.62-0.82 + 0.032- 0.042 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | terbufos COUNTER 15G | 6-8 oz./1000 row ft. | 1.3 lb. a.i./A maximum | 60 (harvest) 30 (grazing) | Apply in a 7-inch band over the seedling corn plants and lightly incorporate into the soil when billbug damage is observed. Counter is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Chinch Bugs | | | | | |
| <i>General Comments: Apply insecticide as a directed spray to the base of plants in at least 15 to 20 gallons of water per acre. See Table 2 for suggested seed treatments and Table 4 for at-planting insecticides for control of chinch bugs.</i> | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.013-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.03-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1-2 qt. | 1-2 | 14 (silage, green) 48 (grain, fodder) | |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ² | 1-2 pt. 0.67-1.33 pt. | 0.47-0.93 0.5-1 | 21 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 19-38 fl.oz. | 0.37-0.74 + 0.007-0.013 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 16-38 fl.oz. | 0.31-0.74 + 0.016-0.038 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025-0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. Use 2.8 fluid ounces for fall armyworm. |
| | deltamethrin DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018-0.022 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA XL Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 (harvest) --- | Asana is a RESTRICTED USE pesticide. |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.54 fl.oz. | 0.015 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.92 fl.oz. | 0.03 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|--|--|--------------------------------|--------------------------------|--|--|
| Chinch Bugs (cont.) | | | | | |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 9 fl.oz. | 0.03 + 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | spinosad + gamma-cyhalothrin CONSERO | 3 fl.oz. | 0.046 + 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 3.2-4 fl.oz. | 0.02-0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |
| Corn Earworms | | | | | |
| <i>General Comments: Using postemergent insecticides to prevent this insect from attacking ears is usually not practical. Insecticides listed here are for control of corn earworm in whorl-stage corn. Early planting may reduce damage from this pest. Corn earworm is also known as the bollworm. See Table 3 for suggested Bt corn for corn earworm control.</i> | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.013-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.03-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1-2 qt. | 1-2 | 14 (silage, green) 48 (grain, fodder) | Make applications directly onto the plant so that the spray will run onto the whorls. |
| | chlorantraniliprole CORAGEN Other trade names ² | 3.5-5.0 fl.oz. | 0.045-0.065 | 14 | |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ² | 1.5-2 pt. 1-1.33 pt. | 0.71-0.93 0.75-1 | 21 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 19-38 fl.oz. | 0.37-0.74 + 0.007-0.013 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|------------------------------|--|--------------------------------|--------------------------------|--|--|
| Corn Earworms (cont.) | | | | | |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 16-38 fl.oz. | 0.31-0.74 + 0.016- 0.038 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025- 0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018- 0.022 | 21 (harvest, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA XL 0.66EC Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 (harvest) | Use if excessively high numbers occur at silking. First application should be at or before silking. Subsequent applications should be made at 3- to 5-day intervals until silking is complete. Asana is a RESTRICTED USE pesticide. |
| | flubendiamide BELT SC | 2-3 fl.oz. | 0.063- 0.094 | 21 (grain, stover) 1 (green, silage) | |
| | gamma-cyhalothrin DECLARE Other trade names ² | 0.77-1.28 fl.oz. | 0.0075- 0.0125 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 0.96-1.6 fl.oz. | 0.015- 0.025 | 21 (grain, fodder, silage) 1 (grazing) | For control of corn earworm before it has entered the stalk or ear. Karate is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 5-9 fl.oz. | 0.016-0.03 + 0.03- 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methomyl LANNATE 2.4LV Other trade names ² | 0.75-1.5 pt. | 0.22-0.45 | 21 (grain, fodder) 3 (grazing, silage) | Apply a minimum of 20 gallons water per acre for best results. Lannate is a RESTRICTED USE pesticide. |
| | permethrin POUNCE 25 WP Other trade names ² | 6.4-9.6 oz. | 0.1-0.15 | 30 (grain, fodder) 0 (forage) | Pounce is a RESTRICTED USE pesticide. |
| | spinetoram RADIANT SC | 3-6 fl.oz. | 0.023- 0.046 | 28 (grain or straw) 3 (forage, fodder, hay) | Use higher rate for heavier infestations or larger larvae. |
| | spinosad TRACER Other trade names ² | 2-3 fl.oz. | 0.062- 0.094 | 28 (grain) 3 (forage, fodder) | Use higher rates for heavier infestations. Time applications to peak egg hatch. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|--|--|--------------------------------|---------------------------------|--|--|
| Corn Earworms (cont.) | | | | | |
| | spinosad + gamma-cyhalothrin CONSERO | 2-3 fl.oz. | 0.03-0.046 + 0.01-0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 1.76-4 fl.oz. | 0.011-0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |
| Cutworms | | | | | |
| <i>See Tables 2 and 4 for suggested seed treatments and broad-spectrum preplant and at-planting insecticides for control of cutworms; see Table 3 for transgenic corn that can control cutworms.</i> | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 0.8-1.6 fl.oz. | 0.007-0.013 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz | 0.033-0.10 | 30 (grain, stover, grazing) 60 (forage) | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. May be applied preplant or preplant insertion. Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 1.24 lb./gal. | 0.025-0.06 + 4.0-10.3 fl.oz. | 30 (grain, stover, grazing) 60 (forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 2 qt. | 2 | 48 (grain, fodder) 14 (green) | Most effective when applied in a 12-inch band over the row. |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ² | 1-2 pt. 0.67-1.33 lb. | 0.47-0.93 0.5-1 | 21 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. Can be applied preplant, at plant, or preemergence. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 13-26 fl.oz. | 0.25-0.51 + 0.004-0.009 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. Can be applied preplant, at plant, or preemergence. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 11-26 fl.oz. | 0.21-0.51 + 0.011-0.026 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 0.8-1.6 fl.oz. | 0.013-0.025 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin DELTA GOLD 1.5 EC | 1-1.5 | 0.012-0.018 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. Can be applied pre- or postemergence. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Cutworms (cont.) | | | | | |
| | esfenvalerate ASANA XL 0.66EC Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 | Asana is a RESTRICTED USE pesticide. Can be applied at planting. |
| | flubendiamide BELT SC | 2-3 fl.oz. | 0.063-0.094 | 28 (grain, stover) 1 (forage, silage) | |
| | gamma-cyhalothrin DECLARE Other trade names ² | 0.77-1.28 fl.oz. | 0.0075-0.0125 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. Can be applied at planting. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 0.64-0.96 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. Can be applied at planting. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 5-9 fl.oz. | 0.016-0.03 + 0.03-0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methomyl LANNATE 2.4LV Other trade names ² | 1.5 pt. | 0.45 | 21 (grain, fodder) 3 (green) | Apply for variegated cutworms. Lannate is a RESTRICTED USE pesticide. |
| | permethrin POUNCE 25 WP Other trade names ² | 6.4-9.6 oz. | 0.1-0.15 | 30 (grain, fodder) 0 (forage) | Pounce is a RESTRICTED USE pesticide. Can be applied at planting. |
| | spinosad + gamma-cyhalothrin CONSERO | 2-3 fl.oz. | 0.03-0.046 + 0.01-0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 1.28-2.8 fl.oz. | 0.008-0.0175 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. Can be applied at planting or prior to planting. |
| European Corn Borers, Southwestern Corn Borers | | | | | |
| <i>See text at beginning for discussion of corn borers. See Table 3 for transgenic corn that can control corn borers.</i> | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.013-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.03-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|---|
| European Corn Borers, Southwestern Corn Borers (cont.) | | | | | |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1.5-2 qt. | 1.5-2 | 14 (silage, green) 48 (grain, fodder) | Apply in the whorls in 20 gallons of water per acre for best control. |
| | chlorantraniliprole CORAGEN Other trade names ² | 3.5-5 fl.oz. | 0.045- 0.065 | 14 | |
| | chlorpyrifos LORSBAN 75 WG Other trade names ² | 1-1.33 lb. | 0.75-1 | 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. |
| | LORSBAN 15G | 3.5-8 oz./ 1000 row ft. | --- | 21 (grain, ears) Grazing interval not specified | |
| | LORSBAN ADVANCED | 1.5-2 pt. | 0.71-0.93 | 21 | Use 1 to 2 pints for chemigation. See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 19-38 fl.oz. | 0.37-0.74 + 0.007- 0.013 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 16-38 fl.oz. | 0.31-0.74 + 0.016- 0.038 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025- 0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018- 0.022 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA XL 0.66EC Other trade names ² | 7.8-9.6 fl.oz. | 0.04-0.05 | 21 (harvest) | Apply just before egg hatch (blackhead stage) or before larvae enter the whorls. Asana is a RESTRICTED USE pesticide. |
| | flubendiamide BELT SC | 2-3 fl.oz. | 0.063- 0.094 | 28 (grain, stover) 1 (forage, silage) | |
| | gamma-cyhalothrin DECLARE Other trade names ² | 0.77-1.28 fl.oz. | 0.0075- 0.0125 | 21 (grain, fodder, stover) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | Apply in whorl before borers have entered stalk or ear. Karate is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--|------------------------------------|--|--|
| European Corn Borers, Southwestern Corn Borers (cont.) | | | | | |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04- 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methomyl LANNATE LV Other trade names ² | 0.75-1.5 pt. | 0.22-0.45 | 21 (grain, stover) 3 (grazing, silage) | Lannate LV is a RESTRICTED USE pesticide. |
| | methoxyfenozide INTREPID 2F | 4-16 fl.oz. | 0.06-0.25 | 21 | Apply at first sign of egg hatch or when infestation reaches threshold level. |
| | methyl parathion PENNCAP-M 2FM Other trade names ² | 2-4 pt. | 0.5-1 | 12 | Penncap-M is a RESTRICTED USE pesticide. |
| | permethrin POUNCE 25 WP Other trade names ² | 6.4-9.6 oz. | 0.1-0.15 | 30 (grain, fodder) 0 (forage) | Pounce is a RESTRICTED USE pesticide. |
| | spinetoram RADIANT SC | 3-6 fl.oz. | 0.023- 0.046 | 28 (grain or straw) 3 (forage, fodder, hay) | Use higher rate for heavier infestations or larger larvae. |
| | spinosad TRACER Other trade names ² | 1-3 fl.oz. (European corn borer) 2-3 fl.oz. (Southwestern corn borer) | 0.031- 0.094 0.062- 0.094 | 28 (harvest) 3 (forage, fodder) | Use higher rates for heavier infestations. Time applications to peak egg hatch. Apply as a broadcast or a directed spray to whorl stage corn; otherwise, apply as a broadcast spray. |
| | spinosad + gamma-cyhalothrin CONSERO | 2-3 fl.oz. | 0.03-0.046 + 0.01- 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 2.72-4 fl.oz. | 0.017- 0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---------------------|--|--------------------------------|--------------------------------|--|---|
| Grasshoppers | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 2.1-2.8 fl.oz. | 0.017-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.033-0.10 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 2.6-6.1 fl.oz. | 0.025-0.06 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 0.5-1.5 qt. | 0.5-1.5 | 14 (silage, green) 48 (grain, fodder) | Use lower rate of Sevin for young grasshoppers or sparse vegetation; use higher rate for larger grasshoppers or thicker vegetation. |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ² | 0.5-1 pt. 0.33-0.67 lb. | 0.23-0.47 0.25-0.5 | 21 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 7-13 fl.oz. | 0.14-0.25 + 0.002-0.004 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 6-13 fl.oz. | 0.12-0.25 + 0.006-0.013 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Grasshoppers (cont.) | | | | | |
| | cyfluthrin TOMBSTONE Other trade names ² | 2.1-2.8 fl.oz. | 0.033-0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin DELTA GOLD 1.5 EC Other trade names ² | 1.0-1.5 fl.oz. | 0.012-0.018 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA 0.66 EC Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 | Asana is a RESTRICTED USE pesticide. |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.02-1.54 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04-0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methyl parathion PENNCAP-M 2FM Other trade names ² | 2-3 pt. | 0.5-0.75 | 12 | PennCap-M is a RESTRICTED USE pesticide. |
| | spinosad + gamma-cyhalothrin CONSERO | 3 fl.oz. | 0.046 + 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 2.72-4 fl.oz. | 0.017-0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |
| Green June Beetle Grubs (in fields where broiler litter has been used) | | | | | |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1-1.5 qt. | 1-1.5 | 14 (silage, green) 48 (grain, fodder) | Treat when there is more than one grub per square foot in the fall prior to planting. Spring treatment when soil temperature is cold is not as effective as an application made in the fall. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Japanese Beetle Adults, Corn Rootworm Adults, Other Silk Feeders, and Flea Beetles | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.013-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.03-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | carbaryl SEVIN XLR PLUS Other trade names ² | 1-2 qt. | 1-2 | 14 (silage, green) 48 (grain, fodder) | Apply when silks first appear and continue until silks dry. |
| | chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ² | 1-2 pt. 0.67-1.33 lb. | 0.47-0.93 0.5-1 | 21 21 (grain, ears) Grazing interval not specified | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 13-42 fl.oz. | 0.25-0.82 + 0.004-0.015 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. Use higher rate for Japanese beetle adults. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 11-42 fl.oz. | 0.21-0.82 + 0.011-0.042 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. See label for specific insect to determine the correct rate. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025-0.044 | 21 (grain, fodder) 0 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018-0.022 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |
| | esfenvalerate ASANA 0.66 EC Other trade names ² | 5.8-9.6 fl.oz. | 0.03-0.05 | 21 | Asana is a RESTRICTED USE pesticide. |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.02-1.54 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|--|--|---|--------------------------------|--|--|
| Japanese Beetle Adults, Corn Rootworm Adults, Other Silk Feeders, Flea Beetles (cont.) | | | | | |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04-0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methomyl LANNATE 2.4LV Other trade names ² | 0.75-1.5 pt. | 0.22-0.45 | 21 (grain, fodder) 3 (green) | Lannate is a RESTRICTED USE pesticide. |
| | methyl parathion PENNCAP-M 2FM Other trade names ² | 2-4 pt. Japanese beetle 1-2 pt. corn rootworm | 0.25-1 | 12 | PennCap-M is a RESTRICTED USE pesticide. |
| | permethrin POUNCE 25 WP Other trade names ² | 6.4-9.6 oz. | 0.1-0.15 | 30 (grain, fodder) 0 (forage) | Pounce is a RESTRICTED USE pesticide. Not registered for Japanese beetles. |
| | spinosad + gamma-cyhalothrin CONSERO | 3 fl.oz. | 0.046 + 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 2.72-4 fl.oz. | 0.017-0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |
| Leafhoppers | | | | | |
| | See Comments. | | | | Leafhoppers are vectors of corn stunt and other plant viruses. Plant virus-resistant varieties, if possible. An at-planting soil systemic insecticide may be beneficial if a variety that is susceptible to corn stunt is planted. |
| Lesser Cornstalk Borers | | | | | |
| <i>See Table 3 for transgenic corn that can control lesser cornstalk borers and Table 4 for at-planting insecticides for control of lesser cornstalk borers.</i> | | | | | |
| | chlorpyrifos LORSBAN ADVANCED | 2 pt. | 0.93 | 21 | Apply as a broadcast spray. See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. |
| | LORSBAN 75WG Other trade names ² | 1.33 lb. | 1 | 21 (grain, ears) Grazing interval not specified | Lorsban 75WG is not. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 38-42 fl.oz. | 0.74-0.82 + 0.013-0.015 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Lesser Cornstalk Borers (cont.) | | | | | |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 32-42 fl.oz. | 0.62-0.82 + 0.032- 0.042 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.02-1.54 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (green) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | DO NOT apply more than 0.12 pound active ingredient per acre per season. Apply as soon as infestation is detected, before borers have entered the stalk. Karate is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04- 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | spinosad + gamma-cyhalothrin CONSERO | 3 fl.oz. | 0.046 + 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| Mites | | | | | |
| | bifenthrin CAPTURE 2EC Other trade names ² | 5.12-6.4 fl.oz. | 0.08-0.10 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 20.48-25.6 fl.oz. | 0.16-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO | 10.3 fl.oz. | 0.1 | 30 (grain, fodder, grazing) | Hero is a RESTRICTED USE pesticide. Do not use Hero in coastal counties. |
| | propargite COMITE | 32-48 fl.oz. | 1.63-2.45 | 30 | Comite is a RESTRICTED USE pesticide. |
| | spiromesifen OBERON 4SC | 2.85-8.0 fl.oz. | 0.09-0.25 | 30 (grain, stover) 5 (forage, silage) | |
| Southwestern Corn Borers <i>See European Corn Borers.</i> | | | | | |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|--|--|--------------------------------|--------------------------------|--|---|
| Stink Bugs | | | | | |
| <i>See discussion of stink bugs in introduction; see Table 2 for suggested seed treatments to control early season stink bugs.</i> | | | | | |
| | beta-cyfluthrin BAYTHROID XL | 1.6-2.8 fl.oz. | 0.013-0.022 | 21 (grain, fodder) 0 (green forage) | Baythroid XL is a RESTRICTED USE pesticide. |
| | bifenthrin CAPTURE 2EC Other trade names ² | 2.1-6.4 fl.oz. | 0.033-0.1 | 30 | Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. |
| | bifenthrin + imidacloprid SWAGGER | 8.45-25.6 fl.oz. | 0.66-0.2 | 30 | Swagger is a RESTRICTED USE pesticide. Do not use Swagger in coastal counties. |
| | bifenthrin + zeta-cypermethrin HERO Other trade names ² | 4.0-10.3 fl.oz. | 0.04-0.1 | 30 (grain, fodder, grazing) 60 (harvest for forage) | Hero is a RESTRICTED USE pesticide. |
| | chlorpyrifos + gamma-cyhalothrin COBALT | 19-38 fl.oz. | 0.37-0.74 + 0.007-0.013 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 16-38 fl.oz. | 0.31-0.74 + 0.016-0.038 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | cyfluthrin TOMBSTONE Other trade names ² | 1.6-2.8 fl.oz. | 0.025-0.044 | 21 (grain, fodder) 1 (green) | Tombstone is a RESTRICTED USE pesticide. |
| | deltamethrin ² DELTA GOLD 1.5 EC | 1.5-1.9 fl.oz. | 0.018-0.022 | 21 (grain, fodder) 12 (green) | Delta Gold is a RESTRICTED USE pesticide. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|--|--------------------------------|--------------------------------|--|--|
| Stink Bugs (cont.) | | | | | |
| | gamma-cyhalothrin DECLARE Other trade names ² | 1.02-1.54 fl.oz. | 0.01-0.015 | 21 (grain, fodder, silage) 1 (grazing) | Declare is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin KARATE with Zeon Technology Other trade names ² | 1.28-1.92 fl.oz. | 0.02-0.03 | 21 (grain, fodder, silage) 1 (grazing) | Karate is a RESTRICTED USE pesticide. |
| | lambda-cyhalothrin + chlorantraniliprole BESIEGE | 6-9 fl.oz. | 0.02-0.03 + 0.04- 0.06 | 21 (grain, fodder, silage) 1 (grazing) | Besiege is a RESTRICTED USE pesticide. |
| | methyl parathion CHEMINOVA METHYL 4EC PENNCAP-M 2FM | 0.5 pt. 1-3 pt. | 0.25 0.25-0.75 | 12 12 | All formulations of methyl parathion are RESTRICTED USE pesticides. Do not apply Cheminova Methyl during the pollen shed period. Do not apply Pennicap-M during pollen shed if bees are foraging in the area to be treated. |
| | spinosad + gamma- cyhalothrin CONSERO | 3 fl.oz. | 0.046 + 0.015 | 28 (grain, fodder, silage) 1 (grazing) | Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together. |
| | zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ² | 2.72-4 fl.oz. | 0.017- 0.025 | 30 (grain, stover) 60 (forage) | Mustang Max is a RESTRICTED USE pesticide. |
| Sugarcane Beetles | | | | | |
| <i>See discussion of sugarcane beetles in introduction. See Tables 2 and 4 for suggested seed treatments and at-planting insecticides to control sugarcane beetles.</i> | | | | | |
| Western Corn Rootworm Larvae | | | | | |
| <i>See Tables 2 and 4 for suggested seed treatments or at-planting insecticides to control western corn rootworm larvae; see Table 3 for transgenic corn that can control western corn rootworm larvae.</i> | | | | | |
| | chlorpyrifos + gamma- cyhalothrin COBALT | 38-42 fl.oz. | 0.74-0.82 + 0.013- 0.015 | 21 (grain) 14 (grazing) | Cobalt is a RESTRICTED USE pesticide. Apply as a cultivation treatment. |

² See Table 7 for other trade names.

| Insect | Insecticide and Formulation | Amount of Formulation per Acre | Lb. Active Ingredient per Acre | Minimum Days from Last Application to Harvest or Grazing | Comments |
|---|---|--------------------------------|-----------------------------------|--|--|
| Western Corn Rootworm Larvae (cont.) | | | | | |
| | chlorpyrifos + lambda-cyhalothrin COBALT ADVANCED | 32-42 fl.oz. | 0.62-0.82 + 0.032- 0.042 | 21 | Cobalt Advanced is a RESTRICTED USE pesticide. |
| | chlorpyrifos LORSBAN 75 WG | 1.33 lb. | 1 | 21 (grain, ears) Grazing interval not specified | Apply granules to base of plants at time of cultivation just ahead of cultivator shovel. |
| | LORSBAN 15G | 8 oz./1000 row ft. | --- | 21 (grain, ears) Grazing interval not specified | Apply 75 WG as a water emulsion to base of plants on both sides of the row just ahead of cultivator shovel. |
| | LORSBAN ADVANCED Other trade names ² | 2 pt./A | 0.93 | 21 | See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. |
| | phorate THIMET 20G Other trade names ² | 4.5-6 oz./ 1000 row ft. | no more than 1.3 lb. a.i./A | 30 | Apply granules at time of cultivation to base of plants just ahead of cultivator shovels. Phorate is a RESTRICTED USE pesticides. |
| | terbufos COUNTER 15G | 8 oz./1000 row ft. | 1.3 lb. a.i./A maximum | 60 (harvest) 30 (grazing) | Apply to base of plants just ahead of cultivator shovels. Counter is a RESTRICTED USE pesticide. |

White Grubs

See Tables 2 and 4 for suggested seed treatments or at-planting insecticides for control of white grubs.

Wireworms

See Tables 2 and 4 for suggested seed treatments or at-planting insecticides for control of wireworms.

NOTE: Read manufacturer's label carefully for specific information for all product use restrictions and safety instructions.

² See Table 7 for other trade names.

Table 6. Relative Efficacy of Postemergence Insecticides for Control of Aboveground (Seedling, Whorl, Stalk, Ear) Field Corn Insects. See Table 5 for Insecticide Rates

| Insecticide | Fall Armyworm (larvae) | True Armyworm (larvae) | Billbug (adults) | Chinch Bug (adults, nymphs) | Corn Earworm (larvae) ¹ | Cutworm (larvae) | European Corn Borer (larvae) ² | Southwestern Corn Borer (larvae) ² |
|------------------|------------------------|------------------------|------------------|-----------------------------|------------------------------------|------------------|---|---|
| Baythroid | 3 | 1-2 | NL | 3 | 1-3 | 1 | L | 2 |
| Tombstone | 3 | 1-2 | NL | 2 | 1-3 | 1 | L | 2 |
| Capture | 2 | 1-2 | NL | 1 | 1-2 | 1 | L | 2 |
| Delta Gold | 2 | 1-2 | NL | L | 1-2 | 1 | L | 2 |
| Asana | 3, NL | 1-2 | NL | 4 | 1-3 | 1 | L | 2 |
| Declare | 2 | 1-2 | NL | 2-3 | 1-2 | 1 | L | 2 |
| Karate | 2 | 1-2 | NL | 3 | 1-3 | 1 | L | 2 |
| Pounce | L | 1-2 | NL | NL | 1-3 | L | L | L |
| Mustang Max | 2 | 1-2 | NL | 2-3 | 1-2 | 1 | L | 2 |
| Hero | 2 | 1-2 | NL | L | 1-2 | NL | L | 2 |
| Sevin | 4 | 1 | NL | 5 | 4 | 3-4 | L | L |
| Lorsban | 2 | 1 | L | 2 | 3 | 2-3 | L | L |
| Lorsban | 2 | 1 | NL | NL | 2 | NL | L | L |
| Intrepid | 2, NL | L | NL | NL | 3, NL | NL | 1-2 | 1-2 |
| Methyl Parathion | 4, NL | 2 | NL | NL | 3, NL | 5 | 5 | 5 |
| Tracer | 2 | 1 | NL | NL | 2-3 | NL | 3 | 3 |
| Consero | 2 | 1 | NL | | 2 | 1-2 | L | L |
| Radiant | L | L | NL | NL | L | NL | L | L |
| Cobalt | 2 | L | L | 2 | 2 | L | L | 2 |
| Cobalt Advanced | 2 | L | L | 2 | 2 | L | L | 2 |
| Belt | 1 | 1 | NL | NL | 2 | L | 1 | 1-2 |
| Coragen | 1 | NL | NL | NL | 1 | 1, NL | 1 | NL |
| Besiege | 2 | L | NL | L | 1 | 1 | 1 | 1 |

continued

Ratings range from 1-5: 1 = very effective; 5 = not effective

"L" means that the insect is on the label for this product. Numerals indicate that additional data on product efficacy in the Southeast is available.

"NL" means the insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is a specific knowledge to the contrary.

¹ Insecticide must be able to reach the target pests. Ratings related to applications made to the target pest before it enters the stalk or ear.² Targeted for second generation larvae before they bore into the stalk or ear.

Table 6. Relative Efficacy of Postemergence Insecticides for Control of Aboveground (Seedling, Whorl, Stalk, Ear) Field Corn Insects. See Table 5 for Insecticide Rates (cont.)

| Insecticide | Flea Beetle (adults) | Grass-hopper (nymphs) | Japanese Beetle, Rootworm (adults) | Lesser Cornstalk Borer (larvae) | Southern Green or Green Stink bug | Brown Stink bug |
|------------------|----------------------|-----------------------|------------------------------------|---------------------------------|-----------------------------------|-----------------|
| Baythroid | 1-2 | 1-2 | 1-2 | NL | 1-2 | 3 |
| Tombstone | 1-2 | 1-2 | 1-2 | NL | 1-2 | 3 |
| Capture | 1-2 | 1-2 | 1-2 | NL | 1 | 2 |
| Delta Gold | 1-2 | 1-2 | L | NL | 1-2 | 3 |
| Asana | 2 | 1-2 | 2 | NL | NL | NL |
| Declare | 1-2 | 1-2 | 1 | NL | 1-2 | 3 |
| Karate | 1-2 | 1-2 | 1-2 | 4-5 | 1-2 | 3 |
| Pounce | | NL | | NL | NL | NL |
| Mustang Max | 1-2 | 1-2 | 1 | NL | 1-2 | 3 |
| Hero | 1-2 | L | 1 | NL | 1-2 | 3 |
| Sevin | 1-2 | L | 1 | NL | NL | NL |
| Lorsban | L | 1-2 | 1-2 | NL | 4, NL | 4, NL |
| Lannate | L | NL | 1-2 | NL | 4, NL | 4, NL |
| Intrepid | NL | NL | NL | NL | 5, NL | 5, NL |
| Methyl Parathion | L | 5 | L | NL | 1 | 1 |
| Tracer | NL | NL | NL | NL | NL | NL |
| Consero | L | 1-2 | L | L | 2 | 3-4 |
| Radiant | NL | NL | NL | NL | NL | NL |
| Cobalt | L | L | 1-2 | 4-5 | 1-2 | 3 |
| Cobalt Advanced | L | L | 1-2 | 4-5 | 1-2 | 3 |
| Belt | NL | NL | NL | NL | NL | NL |
| Coragen | NL | NL | NL | NL | NL | NL |
| Besiege | L | L | L | L | 1-2 | 3 |

Ratings range from 1-5: 1 = very effective; 5 = not effective

“L” means that the insect is on the label for this product. Numerals indicate that additional data on product efficacy in the Southeast is available.

“NL” means the insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is a specific knowledge to the contrary.

¹ Insecticide must be able to reach the target pests. Ratings related to applications made to the target pest before it enters the stalk or ear.

² Targeted for second generation larvae before they bore into the stalk or ear.

Table 7. Insecticides Labeled for Use on Field Corn, Including Worker Protection and Harvest or Grazing Intervals

| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|---|--|--------------------------|--------------------------------|--|
| beta-cyfluthrin *MoA Group 3A | | | | |
| BAYTHROID XL (Restricted Use) | 1 lb./gal. | emulsifiable concentrate | 12 | 21 (grain, fodder) 0 (green forage) |
| bifenthrin MoA Group 3A (Prohibited in all coastal counties) | | | | |
| BIFENTHRIN 2EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| BIFENTHRIN 2EC AG (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| BIFENTURE EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| BRIGADE 2EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| CAPTURE 2EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| CAPTURE 1.15G (Restricted Use) | 0.18 oz./lb. | granular | 24 ¹ | 30 |
| CAPTURE LFR (Restricted Use) | 1.5 lb./gal. | liquid fertilizer ready | 12 | Not specified |
| DISCIPLINE 2 EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| FANFARE 2 EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| SNIPER 2 EC (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| TUNDRA (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 30 |
| bifenthrin + chlorethoxyfos MoA Group 3A + MoA Group 1B (Prohibited in all coastal counties) | | | | |
| SMARTCHOICE 5G LOCK'N LOAD (Restricted Use) | 0.07 lb. bifenthrin + 0.04 lb. chlorethoxyfos | granular | 48 | Not specified |
| bifenthrin + imidacloprid MoA Group 3A + MoA Group 4A (Prohibited in all coastal counties) | | | | |
| SWAGGER (Restricted Use) | 0.5 lb. bifenthrin + 0.5 lb. imidacloprid | emulsifiable concentrate | 12 | 30 |

*MoA = Mode of Action classification from the Insecticide Resistance Action Committee (www.irac-online.org). Insecticides with different MoAs should be used for insecticide resistance management.

¹ REI for detasseling and roguing is 18 days.

² REI for detasseling corn is 21 days.

| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|---|---|--------------------------|--------------------------------|--|
| bifenthrin + indole-3-butyric acid MoA Group 3A (Prohibited in all coastal counties) | | | | |
| EMPOWER ² | 0.0115 % bifenthrin + 0.00001% indole-3-butyric acid | granular | 24 ¹ | 30 |
| bifenthrin + zeta-cypermethrin MoA Group 3A (Prohibited in all coastal counties) | | | | |
| HERO (Restricted Use) | 1.24 lb./gal. (11.25% bifenthrin 3.75% zeta-cypermethrin) | emulsifiable concentrate | 12 | 30 (grain, fodder, grazing) 60 (harvest for forage) |
| STEED (Restricted Use) | 1.5 lb./gal. (9.8% bifenthrin 8.2% zeta-cypermethrin) | | 12 | 30 (grain, stover, grazing) 60 (harvest for forage) |
| carbaryl MoA Group 1A | | | | |
| SEVIN 4F | 4 lb./gal. | liquid suspension | 12 ² | 48 (grain, fodder) 14 (grazing, silage) |
| SEVIN XLR PLUS | 4 lb./gal. | liquid suspension | 12 ² | Same as above |
| CARBARYL 4L, others | 4 lb./gal. | liquid suspension | 12 ² | Same as above |
| SEVIN 80 SOLUPAK | 12.8 oz./lb. | water soluble packet | 12 | Same as above |
| SEVIN 80WSP | 12.8 oz./lb. | water soluble packet | 12 | Same as above |
| SEVIN 80S | 12.8 oz./lb. | water soluble packet | 12 | Same as above |
| chlorantraniliprole MoA Group 28 | | | | |
| DUPONT CORAGEN | 1.67 lb./gal. | suspension concentrate | 4 | 14 |
| DUPONT PREVATHON | 0.43 lb./gal. | suspension concentrate | 4 | 14 |
| chlorethoxyfos MoA Group 1B | | | | |
| FORTRESS 5G (Restricted Use) | 0.003 oz./lb. | granular | 48 | Not specified |
| FORTRESS 2.5G (Restricted Use) | 0.0015 oz./lb. | granular | 48 | Not specified |
| chlorpyrifos MoA Group 1B | | | | |
| LORSBAN 4E (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain) Do not graze |
| LORSBAN ADVANCED (Restricted Use) | 3.755 lb./gal. | water emulsion | 24 | 21 (grain, ears, forage, fodder) |
| GOVERN 4E (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears, forage, fodder) |
| HATCHET (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears, forage, fodder) |

¹ REI for detasseling and roguing is 18 days.² REI for detasseling corn is 21 days.

Corn: Insect, Disease, Nematode, and Weed Control Recommendations for 2012/33

| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|--|----------------------------------|---------------------------|--------------------------------|--|
| chlorpyrifos (cont.) | | | | |
| CHLORPYRIFOS 4E AG (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears) Not specified for grazing or silage |
| NUFOS 4E (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears) Not specified for grazing or silage |
| NUFOS 15G | 2.4 oz./gal. | granular | 24 | 21 (grain, ears) Not specified for grazing or silage |
| YUMA 4E (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears, forage, fodder) |
| WARHAWK (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, ears) 35 (fodder) Not specified for grazing or silage |
| WHIRLWIND (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 24 | 35 (grain, fodder) 14 (grazing, silage) |
| LORSBAN 75WG | 12 oz./lb. | water dispersable granule | 24 | 21 (grain, ears) Not specified for grazing or silage |
| LORSBAN 15G | 2.4 oz./lb. | granular | 24 | 21 (grain, ears) Not specified for grazing or silage |
| SAURUS 15G | 2.4 oz./lb. | granular | 24 | 35 (fodder, grain) 14 (grazing, silage) |
| chlorpyrifos + gamma-cyhalothrin MoA Group 1B + MoA Group 3A | | | | |
| COBALT (Restricted Use) | 2.5 lb./gal. + 0.045 lb./gal. | emulsifiable concentrate | 24 | 21 (grain) 14 (grazing, silage) |
| chlorpyrifos + lambda-cyhalothrin MoA Group 1B + MoA Group 3A | | | | |
| COBALT ADVANCED (Restricted Use) | | emulsifiable concentrate | 24 | 21 |
| clothianidin MoA Group 4A | | | | |
| PONCHO 600 | 5 lb./gal. | seed treatment | n/a | n/a |
| ACCELERON IC-609 | 5 lb./gal. | seed treatment | n/a | n/a |
| clotianidin + <i>Bacillus firmus</i> MoA Group 4A | | | | |
| PONCHO VOTIVO | 4.17 lb./gal. + 0.84 lb./gal. | seed treatment | n/a | n/a |
| cyfluthrin MoA Group 3A | | | | |
| DEFCON 2.1G (Restricted Use) | 0.3 oz./lb. | granular | 48 | Not specified. |
| TOMBSTONE (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 21 (grain, fodder) 0 (grazing, silage) |
| TOMBSTONE HELIOS (Restricted Use) | 2 lb./gal. | emulsifiable concentrate | 12 | 21 (grain, fodder) 0 (grazing, silage) |

| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|---|--------------------------|-------------------------------|--------------------------------|--|
| deltamethrin MoA Group 3A | | | | |
| BATTALION 02EC (Restricted Use) | 0.2 lb./gal. | emulsifiable concentrate | 12 | 21 (grain, fodder) 12 (forage, grazing) |
| DELTA GOLD 1.5 EC (Restricted Use) | 1.5 lb./gal. | emulsifiable concentrate | 12 | 21 (grain, fodder) 12 (forage, grazing) |
| esfenvalerate MoA Group 3A | | | | |
| ASANA XL (Restricted Use) | 0.66 lb./gal. | emulsifiable concentrate | 12 | 21 |
| ADJOURN (Restricted Use) | 0.66 lb./gal. | emulsifiable concentrate | 12 | 21 |
| S-FENVALOSTAR (Restricted Use) | 0.66 lb./gal. | emulsifiable concentrate | 12 | 21 |
| flubendiamide MoA Group 28 | | | | |
| BELT SC | 4 lb./gal. | soluble concentrate | 12 | 1 (forage, silage) 28 (grain, stover) |
| gamma-cyhalothrin MoA Group 3A | | | | |
| DECLARE (Restricted Use) | 1.25 lb./gal. | microencapsulated suspension | 24 | 21 (grain, fodder, silage) 1 (grazing) ³ |
| PROAXIS (Restricted Use) | 0.5 lb./gal. | microencapsulated suspension | 24 | 21 (grain, fodder, silage) 1 (grazing) ³ |
| PROLEX (Restricted Use) | 1.25 lb./gal. | microencapsulated suspension | 24 | 21 (grain, fodder, silage) 1 (grazing) ³ |
| imidacloprid MoA Group 4A | | | | |
| GAUCHO 600F | 5 lb./gal. | liquid used as seed treatment | 12 | Not specified |
| IMIDA E-AG 5F ST | 5 lb./gal. | liquid used as seed treatment | 12 | Not specified |
| DYNA-SHIELD IMIDACLOPRID 5 | 5 lb./gal. | liquid used as seed treatment | 12 | Not specified |
| SENATOR 600 FS | 5 lb./gal. | liquid used as seed treatment | 12 | Not specified |
| ATTENDANT 600 | 5 lb./gal. | seed treatment | 12 | Not specified |
| imidacloprid + metalaxyl MoA Group 4A | | | | |
| CONCUR SEED TREATMENT | 0.25 lb./gal. | dust used as seed treatment | 24 | Not specified |
| imidacloprid + carboxin and metalaxyl MoA Group 4A | | | | |
| LATITUDE | --- | dust used as seed treatment | 24 | 45 |

³ For at-planting applications the grazing interval is 21 days.

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| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|---|--------------------------------|--------------------------|--------------------------------|--|
| lambda-cyhalothrin MoA Group 3A | | | | |
| LAMCAP | 1 lb./gal. | capsule suspension | 24 | 21 (grain, fodder) 1 (grazing) |
| TAIGA-Z (Restricted Use) | 1 lb./gal. | capsule suspension | 24 | 21 (grain, fodder) 1 (grazing) ² |
| GRIZZLY Z 1CS (Restricted Use) | 1 lb./gal. | capsule suspension | 24 | 21 (grain, fodder, silage) 1 (grazing) |
| MYSTIC Z (Restricted Use) | 2.08 lb./gal. | capsule suspension | 24 | Same as above |
| LAMBDA (Restricted Use) | 2.08 lb./gal. | capsule suspension | 24 | 21 |
| LAMBDA-T (Restricted Use) | 1 lb./gal. | capsule suspension | 24 | 21 (grain, fodder, silage) 1 (grazing) |
| LAMBDASTAR (Restricted Use) | 1 lb./gal. | emulsifiable concentrate | 24 | Same as above |
| LAMBDASTAR 1CS (Restricted Use) | 1 lb./gal. | emulsifiable concentrate | 24 | 21 |
| LAMBDA-CY 1EC (Restricted Use) | 1 lb./gal. | emulsifiable concentrate | 24 | 21 (grain, fodder, silage) 1 (grazing) |
| SILENCER (Restricted Use) | 1 lb./gal. | emulsifiable concentrate | 24 | Same as above |
| KARATE with ZEON TECHNOLOGY (Restricted Use) | 2.08 lb./gal. | capsule suspension | 24 | Same as above |
| KAISO 24WG (Restricted Use) | 3.84 oz./lb. | wettable granule | 24 | 21 |
| lambda-cyhalothrin + chlorantraniliprole MoA Group 3A + MoA Group 28 | | | | |
| BESIEGE (Restricted Use) | 0.417 lb. + 0.835 lb./ gal. | water emulsion | 24 | 21 (grain, fodder, silage) 1 (grazing) |
| lindane + carboxin + diazinon MoA Group 2A | | | | |
| KICKSTART VITAVAX- DIAZINON-LINDANE SEED TREATMENT | See Table 2. | seed treatment | 12 | Not specified |
| methomyl MoA Group 1A | | | | |
| LANNATE LV (Restricted Use) | 2.4 lb./gal. | water soluble liquid | 48 | 21 (grain, fodder) 3 (grazing) |
| LANNATE SP (Restricted Use) | 14.4 oz./lb. | water soluble powder | 48 | Same as above |
| methoxyfenozide MoA Group 18 | | | | |
| INTREPID 2F | 2 lb./gal. | liquid | 4 | 21 |

| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|---|--------------------------|-------------------------------|--------------------------------|--|
| methyl parathion MoA Group 1B | | | | |
| 4 LB. METHYL PARATHION (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 96 | 12 |
| PENNCAP M (Restricted Use) | 2 lb./gal. | microencapsulated insecticide | 31 days | 12 |
| CHEMINOVA METHYL 4EC (Restricted Use) | 4 lb./gal. | emulsifiable concentrate | 72 | 12 |
| permethrin MoA Group 3A | | | | |
| ARCTIC 3.2EC (Restricted Use) | 3.2 lb./gal. | emulsifiable concentrate | 12 | 30 (grain, fodder) 0 (forage) |
| PERMETHRIN (Restricted Use) | 3.2 lb./gal. | emulsifiable concentrate | 12 | Same as above |
| PERMETHRIN 3.2EC, others (Restricted Use) | 3.2 lb./gal. | emulsifiable concentrate | 12 | Same as above |
| PERMASTAR AG (Restricted Use) | 3.2 lb./gal. | emulsifiable concentrate | 12 | Same as above |
| PERM-UP 3.2EC (Restricted Use) | 3.2 lb./gal. | emulsifiable concentrate | 12 | Same as above |
| POUNCE 25 WP (Restricted Use) | 4 oz./lb. | wettable powder | 12 | Same as above |
| POUNCE 1.5 G (Restricted Use) | 0.24 oz./lb. | granular | 12 | Same as above |
| AMBUSH 25W (Restricted Use) | 4 oz./lb. | wettable powder | 12 | Same as above |
| permethrin + carboxin MoA Group 3A | | | | |
| KICKSTART VP | See Table 2. | dust used as seed treatment | 12 | Not specified |
| KERNEL GUARD SUPREME | See Table 2. | dust used as seed treatment | 12 | Not specified |
| phorate MoA Group 1B | | | | |
| PHORATE 20G EZ LOAD (Restricted Use) | 3.2 oz./lb. | granular | 48 | 30 |
| THIMET 20-G SMARTBOX OR LOCK 'N LOAD (Restricted Use) | 3.2 oz./lb. | granular | 48 | 30 |
| propargite MoA Group 12C | | | | |
| COMITE (Restricted Use) | 6.55 lb./gal. | emulsifiable concentrate | 13 days | 30 |
| COMITE II (Restricted Use) | 6 lb./gal. | emulsifiable concentrate | 13 days | 30 |
| spinetoram MoA Group 5 | | | | |
| RADIANT SC | 1 lb./gal. | suspension concentrate | 4 | 28 (grain, straw) 3 (forage, fodder, hay) |

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| Insecticide and Trade Name | A.I./ Formulated Product | Formulation | Restricted Entry Interval (hr) | Minimum Days from Last Application to Harvest or Grazing |
|--|--------------------------------|---|--------------------------------|--|
| spinosad MoA Group 5 | | | | |
| BLACKHAWK | 5.8 oz./lb. | wettable powder | 4 | 28 (grain) 3 (forage, fodder) |
| ENTRUST | 12.8 oz./lb. | wettable powder | 4 | 28 (grain, fodder) 7 (forage) |
| SUCCESS | 2 lb./gal. | liquid | 4 | Same as above |
| TRACER | 4 lb./gal. | liquid | 4 | 28 (grain) 3 (forage, fodder) |
| spinosad + gamma-cyhalothrin MoA Group 5 + MoA Group 3A | | | | |
| CONSERO (Restricted Use) | 4 lb./gal. + 1.25 lb./ gal. | co-pack containing 0.5 gallon of each insecticide | 24 | 28 (grain, fodder, silage) 1 (grazing) |
| spiromesifen MoA Group 23 | | | | |
| OBERON 2SC | 2 lb./gal. | liquid | 12 | 30 (grain, stover) 5 (forage, silage) |
| OBERON 4SC | 4 lb./gal. | liquid | 12 | 30 (grain, stover) 5 (forage, silage) |
| terbufos MoA Group 1B | | | | |
| COUNTER 15G LOCK 'N LOAD OR SMARTBOX (Restricted Use) | 2.4 oz./lb. | granular | 48 | 30 |
| thiamethoxam MoA Group 4A | | | | |
| CRUISER 5FS | 5 lb./gal. | seed treatment | 12 | n/a |
| zeta-cypermethrin MoA Group 3A | | | | |
| MUSTANG MAX EC INSECTICIDE (Restricted Use) | 0.8 lb./gal. | emulsifiable concentrate | 12 | 30 (grain, fodder) 60 (forage) |
| RESPECT (Restricted Use) | 0.8 lb./gal. | emulsifiable concentrate | 12 | Same as above |

Other products may be available. Always read the label to make sure the specific crop is listed and to determine what rate to use.

DISEASE AND NEMATODE CONTROL

In general, diseases cause minimal damage to corn most years. Rusts, ear rots, and storage rots are the most widespread and important diseases of corn. Mycotoxin contamination, primarily aflatoxin on rotted grain, is of particular concern to farmers. Stalk rots and viruses may also cause significant losses on limited acreage across the state. Common smut, southern corn leaf blight, and crazy top are reported every year but are of little economic importance. For a more detailed description of corn diseases, see Extension Circular ANR-601, "Corn Diseases."

Most corn diseases can be controlled through the use of good management practices.

- Plant recommended varieties with resistance to viruses and diseases common to your region.
- Select high-quality seed treated with a fungicide.
- Plant only on well-drained and well-prepared seedbeds. Avoid arid or poorly drained soils.
- Maintain balanced fertility levels. Nitrogen and potassium imbalances can increase leaf diseases and stalk rot and cause lodging.
- Rotate corn with non-grass crops. Rotating crops will reduce diseases and nematodes that attack corn.
- Plant early to avoid buildup of aphids and other virus-transmitting insects as well as southern rust.
- Maintain plant populations at recommended levels to reduce stalk rots and lodging.

Fungicides (see Table 9) may partially control fungal leaf blights and rust, but in most cases they are not economical. Fungicide applications to field corn should only be considered when crop prices are good, yield potential is high (more than 120 bushels per acre), and weather conditions at tasseling favor rapid disease development. The need for protective fungicide treatments can often be avoided by planting disease resistant corn hybrids. Southern rust is the most destructive disease on corn. The later corn is planted, the higher the risk of a destructive rust outbreak.

Several species of plant-parasitic nematodes can reduce corn yields sufficiently to cause economic losses. Sting, stubby root, and lesion nematodes are known to be the most damaging species on corn. Southern or cotton root-knot nematodes also attack, damage, and reproduce on all field corn hybrids. Problems with root-knot nematodes occur where corn is rotated with cotton. Crop rotation with non-host crops will prevent the buildup of nematode populations to damaging levels. Corn is immune to the reniform nematode.

Although nematicides are effective against nematodes that attack corn, they are too expensive to use on field corn in most situations. Consequently, they are not recommended for general use in nematode-infested cornfields. Only in rare cases where soil insects and nematodes are a problem would nematicides/insecticides be cost effective.

Table 8. Properties of Nematicides Used on Corn That May Affect Water Quality

| Common Name | Trade Name | Surface-Loss Potential ¹ | Leaching Potential ² |
|-------------|------------|-------------------------------------|---------------------------------|
| Ethoprop | Mocap | Medium | Large |
| Terbufos | Counter | Medium | Small |

¹The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

²The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

Table 9. Fungicides Labeled for Controlling Helminthosporium Leaf Spots, Gray Leaf Spot, and Rust

| Chemical Name | Rate per Acre | Comments |
|--|-----------------|---|
| <i>Aspergillus flavus</i> AFLA-GUARD GR | 10-20 lb. | AFLATOXIN SUPPRESSION: Apply by air or ground between growth stages V10 – V12 and R1 (silking) as an over-the-top broadcast treatment. Use higher rate if aflatoxin contamination has been historically high. |
| azoxystrobin QUADRI FLOWABLE | 6.2-15.5 fl.oz. | For control of northern corn leaf blight, southern corn leaf blight, gray leaf spot, and anthracnose on field corn. Apply when symptoms first appear on lower leaves and repeat 7 to 14 days later as needed. Do not make more than two consecutive applications of Quadris or other Group 4 fungicide. |
| | 6-9 fl.oz. | For control of common rust. See above comments for application timing. |
| azoxystrobin + propiconazole QUILT | 7-14 fl.oz. | For control of northern and southern corn leaf blight. Apply when disease first appears on leaves and make a second application 7 to 14 days later as needed to control disease. |
| | 10.5-14 fl.oz. | For control of eyespot, southern and common rust, anthracnose, and gray leaf spot in field corn. Apply when disease appears and repeat 7 to 14 days later if conditions favor disease development. DO NOT make more than two applications per year. DO NOT apply before tasseling or within 30 days of harvest to corn grown for fodder, grain, or stover. Add a crop oil concentrate or other adjuvant to increase the level of disease control. See label for other use restrictions. |
| QUILT XCEL | 10.5-14 fl.oz. | For control of anthracnose leaf blight, eyespot, common and southern rust, northern and southern corn leaf blights, and gray leaf spot. Apply when disease first appears and repeat 7 to 14 days later. Do not make more than two applications per year. Do not apply before tasseling or 30 days before harvest for forage, grain, or stover. Add a crop oil concentrate or adjuvant to enhance coverage of the foliage. See label for other use restrictions. |
| fluoxastrobin EVITO 480SC | 2-5.7 fl.oz. | For control of southern and common rust, anthracnose, gray leaf spot, Northern and Southern corn leaf blight, and eye spot in field, sweet, and seed corn. Apply at silking to milk stage and again 10 to 14 days later when conditions favor disease. Final application must be no later than the R4 (early soft dough) stage. See label for further use restrictions. |
| mancozeb DITHANE DF | 1.2 qt. | For control of common rust, gray leaf spot, and leaf blight diseases of corn. Begin applications when disease first appears. Use with a spray adjuvant. DO NOT exceed 12 pounds active ingredient mancozeb or maneb-related product per acre per season. |
| DITHANE F-45 | 1.2 qt. | |
| DITHANE M-45 | 1.5 lb. | |
| MANZATE PRO STICK | 1.5 lb. | |
| PENNCOZEB 80W | 1.5 lb. | |
| PENNCOZEB 4F | 0.8-1.2 qt. | |

| Chemical Name | Rate per Acre | Comments |
|---------------------------------|----------------|---|
| propiconazole | | For control of northern and southern corn leaf blight. Apply when disease first appears and continue at 7- to 14-day intervals as needed to control the disease. Use higher rate when conditions favor disease development. DO NOT apply more than 16 fluid ounces per acre per year of any propiconazole formulation to corn grown for grain or within 30 days of harvest to corn grown for fodder, grain, or stover. See label for other use restrictions. |
| BUMPER 41.8 EC | 2-4 fl.oz. | |
| PROPIMAX | 2-4 fl.oz. | |
| TILT 3.6E | 2-4 fl.oz. | |
| | 4 fl.oz. | |
| propiconazole + trifloxystrobin | | For control of eyespot, southern and common rust, and gray leaf spot. Apply when disease first appears and repeat at 7- to 14-day intervals as needed to control disease. DO NOT apply more than 16 fluid ounces per acre per year of any propiconazole formulation to corn grown for grain or within 30 days of harvest to corn grown for fodder, grain, or stover. See label for other use restrictions. |
| STRATEGO YLD | 4-5 fl.oz. | |
| pyraclostrobin | | For control of anthracnose, northern and southern corn leaf blight, eyespot, southern and common rust, and gray leaf spot on field corn. Apply at silking or milk stage and repeat 7 to 14 days later when conditions favor further disease development. DO NOT apply more than 10 fluid ounces per acre per year. See label for further use restrictions. |
| HEADLINE 2.09SC | 6-12 fl.oz. | |
| pyraclostrobin + metconazole | | For control of anthracnose, northern and southern corn leaf blight, Physoderma brown spot, southern and common rust, and gray leaf spot, apply when conditions favor disease and repeat application 7 to 14 days later as needed to control disease. Apply at higher rate and shorter intervals when weather patterns favor disease. Make no more than two consecutive applications of Headline or other Group 4 fungicide. See label for application and resistance management instructions. |
| HEADLINE AMP | 10-14.4 fl.oz. | |
| tebuconazole | | For control of rust, southern corn leaf blight, northern corn leaf blight, and gray leafspot. Apply as protective treatment when conditions favor disease or when symptoms first appear. Repeat applications at 7- to 14-day intervals. A maximum of 24 fluid ounces may be applied per year. See label for additional instructions. |
| MONSOON | 4-6 fl.oz. | |
| ORIOUS 3.6F | | |
| TEBUZOL 3.6F | | |
| TEBUSTAR 3.6F | | |
| | | |
| tetraconazole | | For control of common and southern rust, northern and southern corn leaf blight, gray leaf spot, and anthracnose leaf blight. Apply before disease appears but when conditions favor disease development. Do not apply more than 6 fluid ounces per acre or make more than one application per year. Do not apply between growth stage V8 and VT (tasselling) with an adjuvant. |
| DOMARK 230ME | 4-6 fl.oz. | |

Table 10. Corn Nematode Control

| Nematicide | Amount of Formulation | | Comments |
|--|-----------------------|------------|---|
| | Per 1000 Ft. Row | Per Acre | |
| abamectin + thiamethoxam AVICTA DOU CORN | --- | See label. | FIELD, POPCORN, AND SWEET CORN: Apply with commercial seed treatment equipment. For early season suppression of nematodes. |
| clothianidin + <i>Bacillus firmus</i> I-1582 PONCHO/VOTiVO | --- | See label. | FIELD, POPCORN, AND SWEET CORN: Apply with commercial seed treatment equipment. |
| ethoprop MOCAP 15G LOCK'N LOAD | 12-16 oz. | See label. | FIELD AND SWEET CORN: Apply at planting on 6- to 7-inch band <i>over seed furrow</i> and lightly incorporate. Rate depends on row spacing. See label for applicator settings and application instructions. |
| terbufos COUNTER LOCK'N LOAD 15G | 6-8 oz. | --- | FIELD, SWEET, AND POPCORN: Apply on 7-inch band directly behind planter shoe and in front of press wheel. Incorporate with drag chains or tines. See label for other use restrictions. |
| | 6-8 oz. | --- | Place in <i>seed furrow</i> behind the planter shoe. |

WEED CONTROL

Table 11. Corn Weed Control

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|---|--|
| Preplant Burndown (Reduced Tillage) | | |
| GRAMOXONE INTEON (2-4 pt.) [2 lb./gal.] or FIRESTORM (1.25-2.5 pt.) [3 lb./gal.] + Non-ionic Surfactant (1 qt./100 gal. spray mix) | paraquat (0.5-1 lb.) or paraquat (0.5-1 lb.) + non-ionic surfactant | Use low rate for weeds 1 to 3 inches tall and high rate for weeds 6 inches tall. Apply in 20 to 30 gallons of spray solution per acre. Some regrowth from rye, oats, or wheat may occur after treatment. This regrowth may vary with small grain species, variety, and stage of growth. For these reasons, apply herbicide 10 to 14 days prior to planting. If regrowth occurs, retreat at planting. Good coverage is essential for control. Provides poor control of horseweed. Including 2, 4-D at 1 quart per acre will improve control of wild radish and cutleaf evening primrose. DO NOT make more than three applications of paraquat per year. *MOA–Photosystem I inhibitor |
| ROUNDUP (Various trade names) Generics (0.75-2.1 pt.) [5.5 lb./gal.] or (1-3 pt.) [4 lb./gal.] | glyphosate (0.5-1.5 lb.) (0.5-1.5 lb.) | Use lower rate for most annual weeds. Higher rate may be needed on perennial weeds. Consult label to determine rates for weeds and appropriate growth stages. Can be mixed with 2, 4-D at a rate of 1 quart per acre and applied 7 days prior to planting to improve control of wild radish and cutleaf evening primrose. Refer to label for the need for addition of a non-ionic surfactant to spray mix. MOA–ESP synthesis inhibitor |
| Preplant Incorporated | | |
| ERADICANE 6.7E (4.75 pt.) | EPTC (4 lb.) + safener + extender | Gives good control of annual grasses. It should be incorporated according to label directions immediately after application. Failure to do so will result in loss of the chemical by volatilization. Provides good control of annual grasses and nutsedge. It is weak on many broadleaf weeds. Risk of corn injury on coarse soils is greater where heavy rainfall and cold weather follow treatment. May be mixed with fertilizers (see label) for simultaneous application. DO NOT use on hybrid corn grown for seed. <i>See johnsongrass control section for rates to control nutsedge, wild cane, Texas panicum (buffalograss), bermudagrass, and johnsongrass.</i> MOA– Lipid synthesis inhibitor |

*MOA=Mechanism of action. Herbicides with different MOAs should be used in weed resistance management. See Table 13.

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|--|--|--|
| Preemergence | | |
| AATREX/ATRAZINE 4L (1.6-2 qt.) or AATREX/ATRAZINE 90WDG (1.8-2.2 lb.) | atrazine (1.6-2 lb.) | Controls many annual broadleaf weeds and few grasses. Atrazine does not provide adequate control of panicum, signalgrass, some species of crabgrass, and certain other annual grasses. It may be applied to the soil surface immediately after planting or delayed for up to 3 weeks after planting but before weeds are 1.5 inches tall. Corn has excellent tolerance to atrazine. It may be mixed with liquid fertilizer for simultaneous application. DO NOT apply atrazine combined with liquid fertilizer if corn has emerged. Use the low rate on highly erodible soils (as classed by NRCS) if conservation tillage is not utilized. Use the high rate on highly erodible soils where conservation tillage practices are utilized (more than 30-percent plant residue) or on soils that are not highly erodible. DO NOT exceed 2 pounds active ingredient per acre as a preemergence treatment. DO NOT apply within 50 feet of any well, pond, stream, or sinkhole. Wear protective clothing, boots, and rubber gloves when mixing or loading herbicide. Atrazine is a RESTRICTED USE pesticide. MOA–Photosystem II inhibitor |
| DUAL II MAGNUM 7.64 DUAL MAGNUM 7.62 CINCH 7.64E (1-1.67 pt.) | s-metolachlor (0.95-1.59 lb.) | Controls many annual grasses but is weak on broadleaf weeds. Herbicide is very similar to Micro-Tech for control of most weeds but is more effective on yellow nutsedge. Best results are obtained when rainfall occurs within 4 to 6 days after application. MOA–Mitosis inhibitor |
| HARNES 7EC (1.5-3 pt.) | acetochlor (1.3-2.6 lb.) + safener | Controls most annual grasses and some broadleaf weeds in corn. It can be applied preplant incorporated or preemergence, but before corn emerges. Apply in a minimum of 10 gallons of spray mix per acre, using a spray pressure of 15 to 40 psi. Use the low rate on coarse-textured soils that are low in organic matter and the high rate on fine-textured soils with organic matter less than 3 percent. To control large-seeded broadleaf weeds such as sicklepod, morningglories, and cocklebur, atrazine should be added to the spray mix. See label for rotational crop restrictions. Harness is a RESTRICTED USE pesticide. MOA–Mitosis inhibitor |
| MICRO-TECH 4ME (2-2.75 qt.) | alachlor (2-2.75 lb.) | Controls most annual grasses including fall panicum and some small-seeded broadleaf weeds. It does not effectively control Texas panicum, common cocklebur, or morningglory. Apply to the soil surface during or immediately after planting. Best results are obtained when rainfall occurs within 7 days after application. Under dry conditions, shallow cultivation or rotary hoeing may improve control. Corn has good tolerance toalachlor. Use low rate on coarse soils and high rate on medium-to fine-textured soils. Micro-Tech is a RESTRICTED USE pesticide. MOA–Mitosis inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|--|--|
| Preemergence (cont.) | | |
| OUTLOOK 6L (12-18 fl.oz.) | dimethenamid (0.56-0.84 lb.) | Controls most annual grasses and some broadleaf weeds in field corn. It can be applied preplant incorporated, preemergence, or early postemergence, but before weeds emerge. Incorporation should be in the top 1 to 2 inches of soil. Use lower rates on coarse-textured soils, the intermediate rate on medium soils, and higher rates on fine-textured (heavy) soils. See label for use rate for yellow nutsedge control. Can be tank mixed with other herbicides. DO NOT apply more than 21 fluid ounces per acre per season. MOA–Mitosis inhibitor |
| PRINCEP 4L SIMAZINE 4L (2 qt.) or PRINCEP CALIPER 90 SIMAZINE 90WDG (2.2 lb.) | simazine (2 lb.) | Controls some annual broadleaf weeds and grasses. It provides adequate control of signalgrass, some species of crabgrass, and certain other annual grasses. It must be applied to the soil surface immediately after planting before weeds emerge. Corn has excellent tolerance to simazine. DO NOT apply within 50 feet of any well, pond, stream, or sinkhole. Wear protective clothing, boots, and rubber gloves when mixing or loading herbicide. Simazine requires more rainfall than atrazine for activation. MOA–Photosystem II inhibitor |
| PYTHON 80 WG (0.8-1 oz.) | flumetsulam (0.04-0.05 lb.) | Controls a number of broadleaf weeds. Can be tank-mixed with atrazine and other labeled herbicides for use on field corn to increase spectrum of weed control. Due to crop injury, Python cannot be used when Counter or Thimet insecticides are used. All other insecticides should be applied in a T-band or band to avoid potential crop injury. Has lengthy recropping restrictions for certain crops (canola–26 months, cotton–18 months, peanuts–4 months). See label. MOA–ALS inhibitor |
| SURPASS 6.4EC (1.5-2.75 pt.) | acetochlor (1.2-2.2 lb.) + safener | Controls most annual grasses and some broadleaf weeds in corn. It can be applied preplant, preplant incorporated, preemergence, or early postemergence, but before weeds emerge. Apply in a minimum of 10 gallons of spray mix per acre, using a spray pressure of 15 to 40 psi. Use the low rate on coarse-textured soils that are low in organic matter, the intermediate rate on medium soils, and the high rate on fine-textured soils with organic matter less than 3 percent. See label for higher permissible rates in reduced till or no-till corn. To control large-seeded broadleaf weeds such as sicklepod, morningglories, and cocklebur, atrazine should be added to the spray mix. See label for rotational crop restrictions. Surpass is a RESTRICTED USE pesticide. MOA–Mitosis inhibitor |

Corn: Insect, Disease, Nematode, and Weed Control Recommendations for 2012/45

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|---|---|
| Postemergence | | |
| 2,4-D AMINE (0.5-1 pt.) | 2,4-D amine (0.25-0.5 lb.) | Provides excellent control of most annual broadleaf weeds. Broadcast over-the-top when corn is 4 to 8 inches tall and weeds are small. Use the high rate when weeds are larger and weather is cool. After corn is more than 8 inches tall, apply 1 pint per acre on a broadcast basis using drop nozzles to direct spray to base of plants. Corn may be injured by over-the-top applications when it is silking or tasseling. Corn stalks often become brittle after application; therefore, cultivation should be delayed at least 1 week after application. Prevent spray drift from contacting susceptible crops during application. CAUTION: Use ester formulations carefully because vapors may rise in hot weather after application and may drift considerable distances. Certain corn hybrids may be more susceptible to injury than others. MOA–Synthetic auxin |
| AATREX/ATRAZINE 4L (2 qt.) or AATREX/ATRAZINE 90WDG (2.2 lb.) | atrazine (2 lb.) | Apply before weeds exceed 1.5 inches in height. DO NOT apply atrazine in combination with liquid fertilizer if corn has emerged. DO NOT apply more than 2.5 pounds active ingredient per acre total of Atrazine or AAtrex in one season. Can be applied to corn up to 12 inches tall. Atrazine is a RESTRICTED USE pesticide. MOA–Photosystem II inhibitor |
| AATREX/ATRAZINE 4L (1.25-2 qt.) or AATREX/ATRAZINE 90WDG (1.4-2.2 lb.) + Crop Oil Concentrate (2 pt.) | atrazine (1.25-2 lb.) + crop oil concentrate | Same as for atrazine, above. Addition of crop oil concentrate to postemergence sprays of atrazine speeds the activity and provides quicker kill of weeds; it also allows the use of lower atrazine rates. Use the low rate where broadleaf weeds are the only problem and high rate where broadleaf weeds and grasses are a problem. The addition of crop oil to atrazine sprays may result in crop damage. To minimize risk of injury, follow special precautions and application methods given on the product label. Atrazine is a RESTRICTED USE pesticide. MOA–Photosystem II inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|--|---|
| Postemergence (cont.) | | |
| ACCENT 75 WDG (0.67 oz.) or NIC-IT (2 fl.oz.) or ACCENT Q 54.5 WDG (0.9 oz.) + | nicosulfuron (0.031 lb.) (0.031 lb.) (0.031 lb.) + | Provides postemergence control of some annual grasses, johnsongrass, and some broadleaf weeds. Apply over-the-top of field corn from the two-leaf (V2 stage) to 20 inches in height (but before V6 stage). Apply over-the-top of popcorn or field corn grown for seed up to 20 inches in height. Postemergence directed application can be made to field corn up to 36 inches tall (ten-leaf stage). Weeds should be small and actively growing at time of treatment. Apply in a minimum of 10 gallons of water per acre with a spray pressure of 25 to 40 psi. Avoid overlapping or doubling application at row ends or along field borders. Cultivation 10 to 14 days after application will improve control. DO NOT apply to sweet corn. A repeat treatment 14 to 28 days after treatment can be applied for hard-to-control grasses. DO NOT apply more than 1.3 ounces per acre per year. DO NOT apply to corn previously treated with Counter insecticide. Corn previously treated with a soil-applied organo-phosphate insecticide (Lorsban, Dyfonate, Thimet) may develop temporary corn injury. Severe corn injury may also occur if nicosulfuron application is made within 7 days of a foliar application of 2,4-D, Basagran, Lorsban, malathion, or parathion. There is a 10-month recropping restriction for most crops planted in treated soils with a pH less than 6.5; there is an 18-month restriction for most crops planted in treated soils with a pH greater than 6.5. In johnsongrass-infested fields, apply only to virus-tolerant hybrids. Nicosulfuron does not control crabgrass. Accent Q formulation contains a crop safener. MOA–ALS inhibitor |
| Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix) | non-ionic surfactant or crop oil concentrate | |
| BANVEL 4 (0.5 pt.) or CLARITY 4 (0.5 pt.) | dicamba (0.25 lb.) (0.25 lb.) | Controls most annual broadleaf weeds, including some difficult to control with low rates of 2,4-D. It will not control mustards as well as 2,4-D. Banvel can be applied any time from the corn seedling stage until corn is 36 inches high. Over-the-top sprays are generally more effective when corn is small; drop-nozzle application is better when corn is taller than 8 inches. Clarity can only be used postemergence on corn less than 8 inches tall. DO NOT allow spray drift to contact susceptible plants during application; soybeans and most vegetables are very sensitive to minute amounts of dicamba. DO NOT apply when day temperatures exceed 85 degrees F. DO NOT use crop or petroleum oils with dicamba. MOA–Synthetic auxin |
| BASAGRAN 4 (1.5-2 pt.) | bentazon (0.75-1 lb.) | Apply early postemergence when corn has one to five leaves for control of certain broadleaf weeds and yellow nutsedge suppression. Corn is tolerant to Basagran at all stages, but larger weeds are not as easy to kill. DO NOT apply to corn which is showing stress from drought, cold weather, or other herbicide injury. A crop oil concentrate may be added to the spray mix at a rate of one quart per acre to control certain weeds. Two applications, 7 to 10 days apart, are required for yellow nutsedge control. MOA–Photosystem II inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|---|---|
| Postemergence (cont.) | | |
| BEACON 75 WDG (0.75 oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix) | primisulfuron (0.57 oz.) + non-ionic surfactant or crop oil concentrate | Provides postemergence control of johnsongrass and some broadleaf weeds. Apply Beacon over-the-top or semi-directed to corn when plants are 4 to 20 inches tall but before corn reaches 20 inches in height. DO NOT apply Beacon as a band application directly over the corn rows. If a second split application is made to corn, it can be applied up to the tassel emergence stage if the application is directed. DO NOT exceed 0.75 ounce per acre per year. Weeds must be small and actively growing at time of treatment. Application should be made with ground equipment using 10 to 20 gallons of water per acre at 40 psi spray pressure. Always use water as the carrier. DO NOT use a crop oil concentrate or nitrogen solution when applying Beacon with any other postemergence herbicide (such as dicamba or 2,4-D). DO NOT apply Beacon where Counter has been previously applied to corn. When other soil-applied insecticides have been applied to corn, delay Beacon application for 20 days to reduce possibility of corn injury. DO NOT apply Beacon within 10 days after an organo-phosphate insecticide application or with herbicides containing bentazon or 2,4-D. See label for recropping restrictions. Some corn hybrids are sensitive to Beacon; check with company representatives for current list. In johnsongrass-infested fields, apply only to virus-tolerant hybrids. MOA–ALS inhibitor |
| BUCTRIL 2EC (1-1.5 pt.) or BUCTRIL 4EC (0.5-0.75 pt.) | bromoxynil (0.25-0.375 lb.) | A contact postemergence herbicide that is effective in controlling a number of seedling broadleaf weeds. Use the low rate on susceptible weeds. Apply in a minimum of 20 gallons water per acre and with a minimum spray pressure of 30 psi. Apply over-the-top, beginning when corn is in the four-leaf stage. When corn is 12 inches tall or more, use drop nozzles to direct the spray solution toward the base of the corn plant. DO NOT mix with liquid fertilizer, surfactants, or oils. Observe all precautions. MOA–Photosystem II inhibitor |
| AIM 2 EC (0.5-1 fl.oz.) + Non-ionic Surfactant or Crop Oil Concentrate | carfentrazone (0.008-0.016 lb.) + non-ionic surfactant or crop oil concentrate | Controls several problem broadleaf weeds including tropical spiderwort. Can be applied over-the-top of corn until the V8 stage of growth. Use directed spray on larger corn up to the 14-leaf-collar growth stage. Apply with either a non-ionic surfactant (1 quart per 100 gallons of spray mix) or crop oil concentrate (1 gallon per 100 gallons of spray mix). Aim will cause injury in the form of leaf speckling or necrosis. Increased injury is observed when crop oil concentrate is used. See label for complete list of approved tank mixes. MOA–PPO inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|--|---|--|
| Postemergence (cont.) | | |
| CALLISTRO 4SC (3 fl.oz.) + Crop Oil Concentrate | mesotrione (0.094 lb.) + crop oil concentrate | Controls a number of broadleaf weeds, including small escaped palmer amaranth. Apply to small actively growing weeds and Palmer pigweed smaller than 5 inches in height. Apply with a crop oil concentrate at a rate of 1 gallon per 100 gallons of spray mix. Apply in combination with spray grade UAN (2.5 gallons per 100 gallons of spray mix) or AMS (8.5 pounds per 100 gallons of spray mix). DO NOT use if corn has been treated with soil application of Counter or Lorsban. Corn up to 30 inches tall or up to the eight-leaf growth stage can be treated. See label for possible tank-mix partners. MOA—Carotenoid biosynthesis inhibitor |
| DISTINCT 70WDG (4-6 oz.) + Non-ionic Surfactant | dicamba (0.125-0.189 lb.) + diflufenzopyr (0.05-0.075 lb.) + non-ionic surfactant | Will control many annual broadleaf weeds and will suppress the growth of some annual grasses. Apply 6 ounces per acre when corn is 4 to 10 inches tall and 4 ounces per acre when corn is 10 to 24 inches tall. Must be applied with a non-ionic surfactant (1 quart per 100 gallons of spray mix) and a nitrogen source such as urea ammonium nitrate (UAN) or spray-grade ammonium sulfate (AMS). Use 5 quarts of UAN or 5 pounds of AMS per 100 gallons of spray mix. DO NOT use petroleum-based or methylated seed oils. DO NOT tank mix with Banvel, Clarity, 2,4-D, Poast, Poast Plus, Lorsban, Ambush, or Warrior. Any crop can be planted 120 days after application. DO NOT apply within 15 days of tassel emergence. DO NOT apply more than 10 ounces of Distinct per acre per season. MOA—Synthetic auxin |
| ET (0.4-0.75 fl.oz.) [0.208 lb./gal.] | pyraflufen (0.0007-0.0012 lb.) | Can be applied over-the-top of field corn up to V2 stage of growth. Can be tank mixed with glyphosate for use in Roundup Ready corn to improve the control of annual morningglories. DO NOT use with a crop oil concentrate. MOA—PPO inhibitor. |
| LAUDIS 3.5 SC (3 fl.oz.) | tembotrione (0.082 lb.) | May be useful for the postemergence control of escaped Palmer amaranth in situations where 2,4-D use would be undesirable or glyphosate-, ALS-, or triazine-resistance is suspected. Also provides residual control of several grasses. Tank mixes with Roundup to improve control of pigweeds, ragweed, and morningglory can be applied over-the-top of corn from emergence to V8 growth stage. Two applications can be made (14 days apart), but 6 ounces per acre is the maximum amount allowed per season. Should be applied with a crop oil or methylated seed oil at 1 percent v/v (1 gallon per 100 gallons spray mix). MOA—HPPD inhibitor |
| OPTION 35WDG (1.5-1.75 oz.) | foramsulfuron (0.033-0.038 lb.) | Provides good to excellent control of many annual grasses and johnsongrass. Can be applied over-the-top of corn from emergence to 16 inches tall (V5 stage). Application can be made to corn 16 to 36 inches tall using drop nozzles. Option MUST be applied with a methylated or ethylated seed oil (1.5 pints per acre) and a nitrogen fertilizer (urea ammonium nitrate [UAN]—1.5-2 quarts per acre OR spray-grade ammonium sulfate [AMS]—1.5-3 pounds per acre). DO NOT apply in a nitrogen solution. See label for approved tank mixes. DO NOT use Option if soil insecticide (Counter, Dyfonate, or Thimet) was used previously. Any crop can be planted in treated area after 60 days. DO NOT apply more than 3.5 ounces per acre per year. MOA—ALS inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|--|--|--|
| Postemergence (cont.) | | |
| RESOURCE (2-4 fl.oz.) | flumiclorac (0.013-0.026 lb.) | Apply with Roundup for increase broadleaf control in Roundup Ready corn. Tall ivy leaf and entireleaf morningglory control is enhanced by adding Resource to glyphosate. DO NOT apply before the two-leaf or after the 10-leaf stage of corn development. Use rate is dependent on size of target weed. Use with a non-ionic surfactant (1 quart per 100 gallons of spray mix). MOA–PPO inhibitor |
| SANDEA 75DF (0.66-1.33 oz.) + Non-ionic Surfactant (1-2 qt./100 gal.) or Crop Oil Concentrate (1 gal./100 gal.) | halosulfuron (0.032-0.063 lb.) + non-ionic surfactant crop oil concentrate | Controls many annual broadleaf weeds and nutsedge. Use higher rates for nutsedge and larger weeds. Can be applied over-the-top of corn from spike to layby stages. Can be tank mixed with other postemergence herbicides. See label. DO NOT apply more than 2.67 ounces per acre per year. DO NOT plant wheat for 3 months or soybeans for 10 months following application. MOA–ALS inhibitor |
| Postemergence (Herbicide-Tolerant Varieties) | | |
| IGNITE 280SL (22-29 fl.oz.) | glufosinate (0.4-0.53 lb.) | USE ONLY ON “LIBERTY-LINK” OR “GLUFOSINATE-RESISTANT” CORN HYBRIDS. APPLYING IGNITE TO NON-TOLERANT VARIETIES WILL RESULT IN SEVERE CROP INJURY OR CROP DEATH! Can be applied from time of emergence until corn has reached 24 inches in height (V-7 with seven developed collars). A broad-spectrum material with limited systemic activity, it has no soil residual activity. Effective on a number of annual grasses and broadleaf weeds. Use rate is dependent on the weeds present and their size. Most annual grasses are controlled by the medium and high use rate. Thorough coverage is essential. DO NOT add a surfactant or crop oil concentrate. Can be tank mixed with atrazine. It is rainfast in 4 hours. Make only two applications per season at least 10 to 14 days apart and DO NOT exceed 44 ounces of Ignite per acre per season. No rotation restrictions exist. DO NOT apply within 70 days of harvesting corn grain or within 60 days of harvesting corn forage. Requires the use of spray grade ammonium sulfate (AMS) at 3 pounds per acre (17 pounds per 100 gallons of spray mix). When temperatures exceed 85°F, the rate of AMS can be reduced to 1.5 pounds per acre (8.5 pounds per gallon of spray mix). MOA–Glutamine synthesis inhibitor |
| LIGHTNING 70DG (1.28 oz.) + Non-ionic Surfactant (1 pt./100 gal. spray mix) | imazethapyr (0.042 lb.) + imazapyr (0.014 lb.) + non-ionic surfactant | USE ONLY ON “CLEARFIELD” HYBRIDS. APPLYING LIGHTNING TO NON-TOLERANT VARIETIES WILL RESULT IN SEVERE CROP INJURY AND/OR CROP DEATH! Application requires adding a surfactant and liquid fertilizer solution to the spray mix. Liquid fertilizer solution (such as 28% N, 32% N, or 10-34-0) at the rate of 1 to 2 quarts per acre is recommended. Spray-grade ammonium sulfate may be used at the rate of 2.5 pounds per acre instead of the fertilizer solution. Make postemergence application from the spike stage until corn is 12 inches tall (when weeds are less than 3 to 4 inches tall). Can be tank mixed with other herbicides, but observe all size limitations. DO NOT use crop oil concentrates or seed oils with spray mix. Make only one application per season. Application is rainfast within 1 hour. DO NOT apply to “IMI-Corn” hybrids treated with Counter or Thimet insecticides due to severe crop injury or death. DO NOT tank mix with Accent or Beacon. DO NOT feed or harvest for grain for at least 45 days after application. Recropping restrictions can be significant. Consult label before use to determine compatibility with production plans. MOA–ALS inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|--|---|--|
| Postemergence (Herbicide-Tolerant Varieties) (cont.) | | |
| ROUNDUP (Various trade names) Generics (22 oz.) [5.5 lb./gal.] or (2 pt.) [4 lb./gal.] | glyphosate (0.94 lb.) (1 lb.) | Apply over-the-top in Roundup Ready (RR) Corn hybrids up to the V8 stage or until corn height reaches 30 inches, whichever comes first. Sequential applications can be made, but DO NOT exceed a total of 2 pounds active ingredient glyphosate per acre per season over-the-top. Not all formulations of glyphosate are labeled for use on Roundup Ready corn hybrids. See label for use rate and need for non-ionic surfactant. Sequence is a pre-mix of glyphosate + s-metolachlor. Expert is a pre-mix of glyphosate + s-metolachlor + atrazine. See label for use rates. See label for other tank mixes. MOA–ESP synthesis inhibitor |
| TOUCHDOWN TOTAL (24-35 fl.oz.) | glyphosate (0.78-1.14 lb.) | Apply over-the-top of Roundup Ready (RR) corn hybrids up to V8 stage or until corn height reaches 30 inches, whichever comes first. Sequential applications can be made, but DO NOT exceed a total of 70 fluid ounces per acre per year over-the-top. See label use rate on annual grass control. There is no need for additional surfactant. Avoid application of spray into whorls of corn plants. Allow at least 50 days between treatments or before harvest. MOA–ESP synthesis inhibitor |
| Postemergence Directed | | |
| EVIK 80DF (1.25-2.0 lb.) + Non-ionic Surfactant (1 pt./25 gal. spray mix) | ametryn (1-1.6 lb.) + non-ionic surfactant | Provides excellent control of annual grasses and broadleaf weeds. May temporarily burn back perennials. Evik MUST be applied as a directed spray after corn plants are at least 12 inches tall. DO NOT apply within 3 weeks of tasseling. CAUTION: Over-the-top sprays will kill corn. May be applied in water or liquid nitrogen solutions. Use low rates on small, easily killed weeds and higher rates on larger, hard-to-kill weeds as specified on the product label. Evik is particularly effective on Texas panicum and broadleaf signalgrass. The highest rate will control 6-inch-tall signalgrass. MOA–Photosystem II inhibitor |
| GRAMOXONE INTEON 2.0 (1-2 pt.) or FIRESTORM 3 (0.75-1.3 pt.) + Non-ionic Surfactant | paraquat (0.25-0.5 lb.) (0.25-0.5 lb.) + non-ionic surfactant | For use as a postemergence directed spray after corn is at least 18 inches tall. Spray no higher than the lower 3 inches on the corn stalk. For control of broadleaf weeds and some grasses less than 4 inches tall, a non-ionic surfactant should be added to the spray mixture at the rate of 1 quart per 100 gallons of spray mix. DO NOT mix with liquid fertilizer. DO NOT spray on windy days. Gramoxone and Firestorm are RESTRICTED USE pesticides. MOA–Photosystem I inhibitor |
| LINEX 4L (1.25-1.5 pt.) LOROX 50DF (1.25-1.5 lb.) + Non-ionic Surfactant (1 pt./25 gal. spray mix) | linuron (0.6-0.75 lb.) (0.6-0.75 lb.) + non-ionic surfactant | Provides excellent control of annual grasses and broadleaf weeds. May temporarily burn back perennials. Lorox MUST be applied as a directed spray after corn plants are at least 15 inches tall. CAUTION: Over-the-top sprays will kill corn. May be applied in water or non-pressure nitrogen solution. Use low rate on weeds 2 inches or less and on coarse soils low in organic matter. Use high rate for weeds up to 5 inches and on fine-textured soils. MOA–Photosystem II inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|--|---|--|
| Postemergence Directed (cont.) | | |
| PROWL 3.3EC (1.2-3.6 pt.) or PROWL H ₂ O (1.5-3 pt.) Others (See label.) | pendimethalin (0.5-1.5 lb.) (0.75-1.5 lb.) | Apply as a directed spray after corn is 12 inches tall. Cultivate first with sweep or rolling cultivators to throw at least 1 inch of soil over the base of the corn plants prior to application. Must be incorporated using cultivators or irrigation water. Set cultivators to provide maximum soil mixing; move treated soil into the crop rows. This herbicide is effective on late-emerging problem grasses such as fall panicum and Texas panicum. MOA–Mitosis inhibitor |
| TREFLAN HFP (1-2 pt.) Others (See label.) | trifluralin (0.5-1 lb.) | Apply as a directed spray after corn is 12 inches tall and incorporate with a sweep-type or rolling cultivator. Cultivate first to cover the base of the corn plants with soil prior to application. Apply herbicide and then set cultivators to provide maximum soil mixing, to move treated soil into the crop row, and to avoid exposing untreated soil. This herbicide is effective on late-emerging problem grasses such as fall panicum and Texas panicum. MOA–Mitosis inhibitor |
| Harvest Aid | | |
| 2,4-D (1-2 pt.) [3.8 lb./gal.] | 2,4-D (0.475-0.95 lb.) | Apply when corn has reached the hard dough stage to suppress or control weeds and vines, which interfere with harvesting. Observe drift precautions on label to prevent damage to non-target areas. Wait 5 to 7 days after application before harvesting. MOA–Synthetic auxin |
| AIM 2EC (1.9 fl.oz.) + Crop Oil Concentrate | carfentrazone-ethyl (0.031 lb.) + crop oil concentrate | Apply after corn is mature and the grain has begun to dry down. Apply as a broadcast spray in sufficient spray volume to give complete coverage of crop and weeds such as morningglories, pigweed, and velvetleaf. Use a crop oil concentrate at rate of 1 gallon per 100 gallons of spray solution. A minimum of 3 days must be allowed between Aim application and grain harvest. MOA–PPO inhibitor |
| GRAMOXONE INTEON2 (1.2-2 pt.) or FIRESTORM 3 (0.8-1.3 pt.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) | paraquat (0.3-0.5 lb.) paraquat (0.3-0.5 lb.) + non-ionic surfactant | Applications must be made at least 7 days before harvest. Apply after corn is mature and black layer has formed at the base of the kernels. MOA–Photosystem I inhibitor |
| ROUNDUP (Various trade names) Generics (22 oz.) [5.5 lb./gal.] or (2 pt.) [4 lb./gal.] | glyphosate (0.94 lb.) (1 lb.) | Apply 7 days before harvest when kernal moisture is less than 35 percent and after black layer formation. Avoid drift onto sensitive crops or sites. DO NOT use on corn grown for seed if hybrid is not Roundup Ready Corn 2. Not all formulations of glyphosate may be labeled for use as a harvest aid. See product label. MOA–ESP synthesis inhibitor |

| Herbicide Trade Name (Rate/Acre Broadcast) | Herbicide Common Name (Active Herbicide/Acre) | Comments |
|---|---|---|
| Harvest Aid (cont.) | | |
| SODIUM CHLORATE (2 gal. of 3-lb. material) or SODIUM CHLORATE (1 gal. of 6-lb. material) | sodium chlorate (6 lb.) sodium chlorate (6 lb.) | Apply after corn is in black layer stage. Apply at least 14 days before anticipated harvest date on a bright, sunny day when temperature is above 75°F. Apply in 5 to 7 gallons of water by air. Grasses (such as johnsongrass) will be desiccated. Broadleaf weeds will probably be only defoliated. MOA–N/A |
| Johnsongrass Control | | |
| Johnsongrass causes yield reductions in corn by competing with the crop for plant nutrients. In addition, johnsongrass serves as an alternate host to virus diseases. | | The diseases are then transmitted to the corn by insects. Control of johnsongrass in fields and along field borders is essential for optimum production. |
| ACCENT 75 WDG (0.67 oz.) or NIC-IT (2 fl.oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix) | nicosulfuron (0.031 lb.) (0.031 lb.) + non-ionic surfactant crop oil concentrate | Same as Comments for nicosulfuron in the Postemergence section. Apply over-the-top of corn when rhizome johnsongrass is 8 to 12 inches tall and seedling johnsongrass is 4 to 10 inches tall. A second application can be made 14 to 28 days later when johnsongrass regrowth is 8 to 10 inches tall. DO NOT apply later than the ten-leaf stage of corn. DO NOT apply more than 1.33 ounces of WDG or 4 fluid ounces of 2 pounds per gallon liquid per acre per year. MOA–ALS inhibitor |
| BEACON 75 WDG (0.75 oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix) | primisulfuron (0.57 oz.) + non-ionic surfactant crop oil concentrate | Same as Comments for Beacon in the Postemergence section. Seedling johnsongrass should be 4 to 12 inches tall, and rhizome johnsongrass should be 8 to 16 inches tall at time of first application. Two applications at half the labeled rate are permitted to control johnsongrass and subsequent regrowth. The second application should be made 10 to 20 days after the first application. DO NOT apply more than 0.75 ounce of Beacon per acre per year. DO NOT use a crop oil concentrate or nitrogen solution when applying Beacon with any other postemergence herbicide (such as dicamba or 2,4-D). MOA–ALS inhibitor |
| ROUNDUP (Various trade names) (1.4-2 qt.) [5.5 lb./gal.] | glyphosate (1.9-2.75 lb.) | Apply as a foliar treatment after harvest while johnsongrass is still growing and has produced at least 12 inches of regrowth (after mowing or plowing). Apply in 10 to 30 gallons of water per acre. Allow at least 7 days after application before tillage. Additional fall tillage will increase control: it chops rhizomes into small pieces. Use preplant or preemergence herbicide application in following year's crop to control seedling johnsongrass. See label for non-ionic surfactant use rate. MOA–ESP synthesis inhibitor |
| TOUCHDOWN TOTAL (1.4-2.2 qt.) | glyphosate (1.46-2.3 lb.) | Apply as a foliar spray after harvest when johnsongrass is at boot to head stage and in the fall prior to harvest. There is no need for surfactant addition. See Powermax comments for further control strategies. DO NOT exceed total of 5.75 quarts of Touchdown Total from all applications per year. MOA–ESP synthesis inhibitor |

Table 12. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama ¹

| WEEDS | HERBICIDES | | | | | | |
|--------------------------|------------------------------|---------------|-------------------------|------------------|------------------|------------------------------|-----------------|
| | AAtrex, Atrazine (PRE) | Dual (PRE) | Micro- Tech (PRE) | Outlook (PRE) | Princep (PRE) | Surpass, Harness (PRE) | Python (PRE) |
| GRASSES | | | | | | | |
| Broadleaf Signalgrass | 2 | 8 | 8 | 8 | 6 | 8 | 2 |
| Crabgrass | 8 | 9 | 9 | 9 | 8 | 9 | 4 |
| Crowfootgrass | 7 | 9 | 9 | 9 | 8 | 9 | 2 |
| Fall Panicum | 3 | 8 | 8 | 9 | 8 | 9 | 2 |
| Goosegrass | 8 | 9 | 9 | 9 | 8 | 9 | 2 |
| Johnsongrass (rhizomes) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnsongrass (seedlings) | 4 | 5 | 5 | 5 | 5 | 6 | 2 |
| Texas Panicum | 0 | 4 | 4 | 5 | 2 | 4 | 2 |
| SEDGES | | | | | | | |
| Purple Nutsedge | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| Yellow Nutsedge | 0 | 7 | 5 | 7 | 0 | 7 | 0 |
| BROADLEAF WEEDS | | | | | | | |
| Bristly Starbur | 7 | 0 | 0 | 0 | 8 | 0 | 8 |
| Cocklebur | 7 | 0 | 0 | 0 | 7 | 0 | 9 |
| Florida Beggarweed | 8 | 6 | 6 | 5 | 9 | 5 | 7-8 |
| Florida Pusley | 8 | 9 | 9 | 9 | 9 | 9 | 8 |
| Morningglory | 7 | 0 | 0 | 0 | 7 | 0 | 7-8 |
| Pigweed | 8 | 8 | 9 | 9 | 9 | 9 | 8 |
| Prickly Sida | 9 | 6 | 6 | 4 | 9 | 7 | 9 |
| Sicklepod | 7 | 5 | 7 | 5 | 8-9 | 4 | 7 |

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

PRE = Preemergence.

M = Medium. -- = Information not available.

Table 12. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama ¹ (cont.)

| WEEDS | HERBICIDES | | | | | | | |
|--------------------------|--------------------------|-------------------------------|----------------------------|------------------------------|--------------------|---------------|------------------|---------------------|
| | 2,4-D amine (POST) | AAtrex, Atrazine (POST) | NIC-IT Accent (POST) | Banvel/ Clarity (POST) | Basagran (POST) | Aim (POST) | Beacon (POST) | Callistro (POST) |
| GRASSES | | | | | | | | |
| Broadleaf Signalgrass | 0 | 2 | 8-9 | 0 | 0 | 0 | 0 | 0 |
| Crabgrass | 0 | 7 | 6 | 0 | 0 | 0 | 0 | 7 |
| Crowfootgrass | 0 | 6 | 8 | 0 | 0 | 0 | 0 | 0 |
| Fall Panicum | 0 | 4 | 8 | 0 | 0 | 0 | 7 | 0 |
| Goosegrass | 0 | 5 | 9 | 0 | 0 | 0 | 0 | 0 |
| Johnsongrass (rhizomes) | 0 | 0 | 8 | 0 | 0 | 0 | 8 | 0 |
| Johnsongrass (seedlings) | 0 | 2 | 9 | 0 | 0 | 0 | 8 | 0 |
| Texas Panicum | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 |
| SEDGES | | | | | | | | |
| Purple Nutsedge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Yellow Nutsedge | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 6 |
| BROADLEAF WEEDS | | | | | | | | |
| Bristly Starbur | 7 | 7 | 0 | 8 | 9 | 0 | 0 | 0 |
| Cocklebur | 9 | 9 | 6 | 9 | 9-10 | 8 | 4 | 8-9 |
| Florida Beggarweed | 7 | 7 | 7 | 8 | 0 | 7 | 8 | 0 |
| Florida Pusley | 8 | 8 | 5 | 7 | 0 | 7 | 7 | 0 |
| Morningglory | 9 | 9 | 7 | 9 | 4 | 8-9 | 7 | 7-8 |
| Pigweed | 9 | 8 | 8 | 9 | 4 | 8 | 8 | 8 |
| Prickly Sida | 7 | 7 | 0 | 8 | 7 | 7 | 6 | 5 |
| Sicklepod | 8 | 8 | 0 | 9 | 0 | 5 | 6 | 4 |

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top.

S = Small; M = Medium; L = Large. -- = Information not available.

Table 12. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama ¹ (cont.)

| WEEDS | HERBICIDES | | | | |
|--------------------------|-------------------|--------------------|-------------------|---------------------|------------------|
| | Buctril (POST) | Distinct (POST) | Liberty (POST) | Lightning (POST) | Option (POST) |
| GRASSES | | | | | |
| Broadleaf Signalgrass | 0 | 3 | 8 | 7 | 8 |
| Crabgrass | 0 | 3 | 8 | 8 | 6 |
| Crowfootgrass | 0 | -- | 8 | -- | 0 |
| Fall Panicum | 0 | 3 | 8 | 6 | 8 |
| Goosegrass | 0 | 0 | 5 | 3 | 8 |
| Johnsongrass (rhizomes) | 0 | 0 | 6 | 5 | 8 |
| Johnsongrass (seedlings) | 0 | 3 | 8 | 8 | 8 |
| Texas Panicum | 0 | 0 | 8 | 6 | 7 |
| SEDGES | | | | | |
| Purple Nutsedge | 0 | 3 | 7 | 5 | 0 |
| Yellow Nutsedge | 0 | 3 | 7 | 5 | 0 |
| BROADLEAF WEEDS | | | | | |
| Bristly Starbur | 7 | 0 | 8 | -- | 0 |
| Cocklebur | 9 | 9 | 8 | 9 | 6 |
| Florida Beggarweed | 7 | -- | 9 | -- | 0 |
| Florida Pusley | 8 | 0 | 7 | 7 | 0 |
| Morningglory | 7 | 9 | 8 | 8 | 6 |
| Pigweed | 8 | -- | 7 | 8 | 8 |
| Prickly Sida | 4 | 9 | 7 | -- | 0 |
| Sicklepod | 0 | 7 | 8 | 6 | 0 |

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top.

S = Small; M = Medium. -- = Information not available.

Table 12. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama ¹ (cont.)

| WEEDS | HERBICIDES | | | | |
|--------------------------|------------------|---------------|---------------------------------|----------------|--------------|
| | Sandea (POST) | Evik (PDS) | Firestorm Gramoxone (PDS) | Lorox (PDS) | Aim (HAR) |
| GRASSES | | | | | |
| Broadleaf Signalgrass | 0 | 8 | 8 | 7 | 0 |
| Crabgrass | 0 | 8 | 4 | 8 | 0 |
| Crowfootgrass | 0 | 8 | 8 | 8 | 0 |
| Fall Panicum | 0 | 8 | 8 | 8 | 0 |
| Goosegrass | 0 | 8 | 8 | 8 | 0 |
| Johnsongrass (rhizomes) | 0 | 0 | 3 | 4 | 0 |
| Johnsongrass (seedlings) | 0 | 8 | 8 | 7 | 0 |
| Texas Panicum | 0 | 7-8 | 8 | 7 | 0 |
| SEDGES | | | | | |
| Purple Nutsedge | 7-8 | 7 | 4 | 4 | 0 |
| Yellow Nutsedge | 7-8 | 7 | 4 | 4 | 0 |
| BROADLEAF WEEDS | | | | | |
| Bristly Starbur | 8 | 8 | 7 | 8 | 0 |
| Cocklebur | 9 | 7 | 7 | 9 | 7 |
| Florida Beggarweed | 4 | 9 | 8-9 | 8 | 6 |
| Florida Pusley | 8 | 8 | 6 | 8 | 7 |
| Morningglory | 7 | 8 | 6-8 | 8 | 9 |
| Pigweed | 8 | 9 | 8-9 | 9 | 8 |
| Prickly Sida | 3 | 9 | 6 | 8 | 6 |
| Sicklepod | 2 | 9 | 8-9 | 8 | 0 |

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top; PDS = Postemergence Directed Spray; HAR = Harvest Aid.

S = Small; M = Medium; L = Large. -- = Information not available.

Table 13. Herbicide Classification by Mechanism of Action

| Mechanism of Action | Herbicides |
|-----------------------------------|--|
| ALS inhibitor | Python, Accent/Nic-It, Beacon, Option, Sandea, Lightning |
| Carotenoid biosynthesis inhibitor | Callistro |
| ESP synthesis inhibitor | Roundup, Touchton |
| Glutamine synthesis inhibitor | Ignite |
| Lipid synthesis inhibitor | Eradicane |
| Mitosis inhibitor | Dual/Cinch, Harness, Micro-Tech, Outlook, Surpass, Prowl/Pendimax, Treflan |
| Photosystem I inhibitor | Gramoxone Inteon/Firestorm |
| Photosystem II inhibitor | Aatrex/Atrazine, Princep/Simazine, Basagran, Buctril, Lorox/Linex, Evik |
| PPO inhibitor | Aim, Resource, ET |
| Synthetic auxin | 2,4-D, Banvel/Clarity, Distinct |

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For more information, contact your county Extension office. Visit <http://www.aces.edu/counties> or look in your telephone directory under your county's name to find contact information.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or canceled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

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